Indus & its Delta

Anwer Pirzado

Indus
& it's
Delta

Anwer Pirzado

Indus & it's Delta

Anwer Pirzado

Year:	**January 2013**
Composing and Pesting :	**Umair Ali Memon (0314-2580057)**
Title Design :	**Ameeq Pirzado**
Title Photography :	**Qaisar Pirzado**
Printing:	**Al-Jannat Press Karachi**
Quantity:	**1000**
Price Rs:	**250/-**
Published by:	**ANWER PIRZADO ACADEMY Ph: 0334-3007566**

CONTENTS

PREFACE

...FROM ANWER PIRZADO ACADEMY

Anwer Pirzado was of the opinion that publishing of the books is not the job of writers but of the publishing companies and institutes. Unfortunately in Pakistan and particularly in Sindh this area is still undeveloped. Realizing this dark scenario and the importance of legendary Sindhi figure Anwer Pirzado's creative, intellectual and research work, his three sons (Zarar, Zaid and Amar) along with few close friends formed "Anwer Pirzado academy" on his "treejho" to compile his valuable writings and publish in the form of books. So far from the platform of Anwer Pirzado academy we have published 8 books in Sindhi language entitled as Mataan Wisaryo (his famous short columns), Mumbai yatra (travellogue of Mumbai) Bhittai (compilation of his articles and lectures on Bhittai), Mohen jo Daro (articles about archeological sites of sindh), Jadeed Sindhi Adab (articles about Sindhi literature), Sindh (mixed articles), Bhun Jhun (columns and editorials) and Interview aien taqreeron (interviews and speeches). In this way we have so far greatly com-

piled most of his writings in Sindhi language.

Anwer Pirzado academy has now taken the challenging task in its hands to similarly publish all of his english writings. Anwer Pirzado with very few other contemporary writers was one of the first Sindhi writers who fought the case of Sindh in english language by regularly reporting about socio-economic and political aspects in daily Dawn, Star, Herald, Sindh tribune, The regional times of Sindh etc. Anwer Pirzado spent all his life authoring and documenting almost all the diversified aspects of Sindh from Bhittai to Mohen jo daro, from Khirthar mountains to Thar, from Indus to Culture and Civilization, from Folk festivals to Cultural heritage of Sindh.

The book which is in your hands is a significant document about Indus and Indus delta, its beauty, importance and current issues. Anwer Pirzado has always fought for the core issue of water on all forums. He always thought that the issue of water is the survival issue of Sindh and its people. Articles like unjust water distribution, water shortage and water theft are been reported in the history of Sindh as a part of this struggle.

One of the long-awaited wish of Anwer Pirzado was to travel along Indus river which was accomplished when he got the offer from Sindh culture department to travel on boats and carried out expedition of Indus in 1989. This exciting and knowledgeable voyage lasted for 22 days and nights from Attock to kati bandar. This book includes his exclusive experiences about Indus expedition.

Anwer Pirzado also got the chance to work for Pakistan Fisherfolk Forum where he got an opportunity to observe the Indus delta area much more closely. He wrote a research report on the assignment of Pakistan Fisherfolk

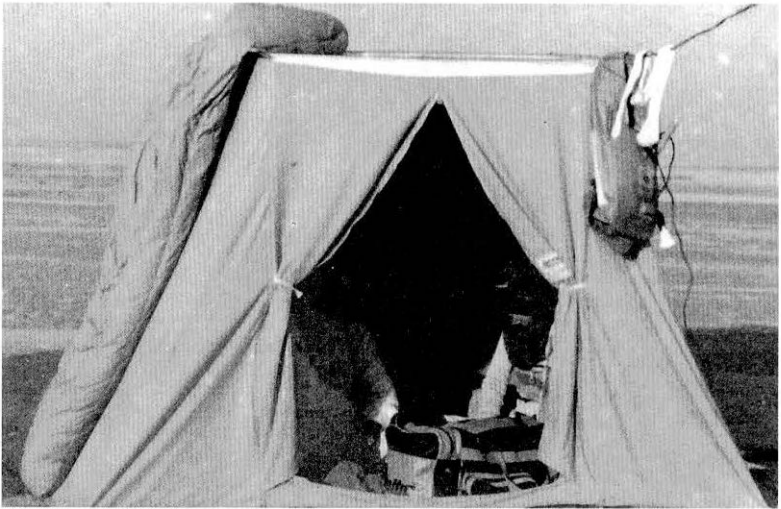
Forum which initially was supposed to be published by fisherfolk but due to some reasons it could not happen. Therefore, with the consent of Pakistan Fisherfolk Forum we are also including that exclusive research study in this book. In 2001 he was invited to SANA conference in Washington DC where he delivered his memorable speech about water issue in Sindh, which is also a part of this book.

In last we would like to deeply thank and acknowledge the partial financial support to publish this book by Sarfraz Memon, one of the colleagues and close friends of my father.

In our opinion Anwer Pirzado was a social scientist who has rediscovered Sindh by always exploring and signifying the various aspects of Sindh and exploring valaubales buried deep down in the rich history of Sindh. Therefore, we think it is our prime responsibility to compile and publish all of his valuable writings. I hope the readers would understand the fact that this is a book of compilations of his various writings written at different times therefore we are sorry for any repetitions, if any.

We are sure with the kind support and cooperation of readers we would accomplish our aforementioned mission. We hope this book would serve as a reference book about Indus and Indus delta and would help convey the Sindh sentiments and perspective to English readers.

Dr Zaid Pirzado
Anwer Pirzado academy
A/64, Ph I, Gulshan-e-Hadid Karachi
Contact # 0334-3007566

INDUS EXPEDITION

Anwer Pirzado with Badar Abro during Indus expedition 1989

EXPEDITION INDUS-1989

PROLOGUE

One fine morning, in the middle of October during the year 1989, as I was passing hurriedly through the corridor of Sindh Secretariat (at Karachi), I came across Mr Kalim Lashari, the then Deputy Secretary, Sindh Culture Department.

He was equally in hurry as he was going to attend some official meeting. However, wearing a meaningful smile on his face, he said "Would you and Badar (Abro) like to join us on an Indus voyage?"

The question shook my inner-self. And in the state of excitement, something came out of my mouth spontaneously . . . "Yes, of course."

But before I overcome the excitement pertaining to the possibility of having such a great opportunity of enjoying Indus voyage, the hands we shook enthusiastically a few moments before were withdrawn with reciprocity. Now while moving in different directions after bidding farewell to each other, Kalim Lashari invited me to his

office to speak about his offer in detail.

But before I called on Mr. Kalim Lashari in his office to discuss the offer minutely, I rushed to my journalist friend Mr. Badar Abro, who by then was working for a Sindhi daily Hilal-e-Pakistan, Karachi.
And when I told him about the offer of Indus voyage given by Mr. Kalim Lashari, his instant reaction was "We must go."

Meanwhile a few days passed away, and one day I happened to barge into the office of Mr. Lashari. He said, "Look, Anwer! you are having an important assignment of the Sindh Culture Department for translating the voluminous book of Dr. H.T. Sorley on Sindh's greatest poet Shah Abdul Latif Bhitai in Sindhi. So, if you join us on Indus voyage, which in fact is an Indus Expedition, and is likely to take about a month, your assignment would suffer as you would not be able to meet the deadline. So, think about it seriously and only then get ready to go along with us."

When I gave a rational thought to it, I found the piece of advice given by Mr. Lashari quite reasonable, and in my self interest. It was because I was unemployed those days and was making my both ends meet through freelance journalism. So, I thought if the income from the translation work goes minus, how I would pull on as I have to feed my family, and that I had no any savings as well. Thus I agreed with Mr. Lashari, but quite unwillingly to take up the translation work and drop the idea of joining expedition of Indus.

But whenever I happened to meet my friend Mr. Badar Abro, he always insisted on joining the Expedition

Indus. As a matter of fact I never told him that I had agreed with Mr. Lashari that I may be dropped from the expedition team so that I could accomplish the assignment of translating Sorley's book on Bhitai.

And I also wished that if I am not there, my friend Mr. Badar Abro must also not be there. It was some sort of professional jealousy between two old friends. I therefore always tried to give an impression to my friend that the bureaucrats happened to be treacherous always, therefore there were least chances of we two joining the Indus expedition as it was being organised by the Cltre Department of Sindh government.

But my friend (Badar Abro) always favored joining the expedition, if after all it was possible.

Thus the time kept on passing with its set speed. My prima facie policy was to console my friend and make him mentally ready to give up high expectations about joining the expedition more so because I myself was undecided about it.

One day the local Sindhi newspapers carried a short news item saying that such and such persons were ready to embark upon a voyage of Indus from Attock in the north to the Arabian Sea in the south.

The date announced for initiation of their voyage was only two days later. The same day in the evening when I happened to meet Badar Abro, he said, " Have you gone through the news about Indus Expedition ? "

I said, " Yes". He said in a tone of lamenting, " So, we are not there!" - I tried to console him, saying, " Look, Badar ! the world is such. So you better forget about it and plan for something else."

In reply he had a long pause after which he said, " Okay, let us chalk out a program to visit some Stone Age sites in Sukkur area if after all we are not to be included in the Expedition Indus !"

But in the same breath, he said, " Why shouldn't we make the last ditch effort to be included in the expedition?" I said, " What sort of effort ". He said, " Just think about it, I don't know exactly what to do?

" I said, " Okay, let us go to see Madam Mehtab Rashdi (who was, by then, the secretary, Sindh Culture department.) He agreed, and we planned to visit her in the office the very other day.

It was in fact some sort of a desperate effort on our part as the day we planned to meet the Secretary, Sindh Culture department, was simply at the nick of time as the expedition was to begin only two days later at a far off place such as Attock.

Now we were sitting in front of Madam Mehtab Rashdi, the Secretary, Sindh Culture department in her decorated office. And after formal chitchat, I expressed on behalf of Mr. Badar Abro and myself a very strong desire to join the Expedition Indus. On it quite instantly, she lowered down her hand (which was equally beautiful as she herself was) to press the button of the buzzer of her telephone set to call her Private Secretary.

The man was on the line the other moment. And what we heard Madam saying on wire was, "Arrange air tickets for Anwer Pirzado and Badar Abro, two journalists, to fly to Islamabad tomorrow by all means. They have to join the Expedition Indus at Attock the day after."

THE INDUS-FLOWING THROUGH HISTORY

Indus, the greatest Himalayan river, which falls from the height of 29,000 feet above sea-level and continues its flow downwards to the sea, has lured generations of conquerors, tourists, explorers and people with great aesthetic sense all over the world. Emanating from Parkutta region of Tibet and leaving behind the fathomless Mansrover lake of the Himalyan mountains, this legendary river, crosses 2945 kilometres of zigzagging distance to maintain its eternal link with the ocean in the south. It enters into present Pakistan's territory at a place known as Bagh-e-Darband after visiting Kashmir and some parts of India.

In Latin, this river is named as Sindus, in Greek it is called Sinthos and the Sanskrit language writes it as Sindhu. It was due to some phonetic variations that the word 'Sindh' was pronounced as 'Hindh', and 'Ind', which finally resulted in the naming of this river as INDUS by the occidentals. It is also known as the 'Lion river', and 'Nylab', 'Abasin' and 'Mehran'.

About its age, experts of geology and physical geography of the Indus valley believe that it is as old as the earth. It has perhaps seen glimpses of human life around it

right from the Stone Age when people lived in caves. It also witnessed the growth of the highly organized society of the Indus civilization, remains of which are seen in the ruins of Harappa and Mohen Jo Daro.

Topographically, the course of Indus, which is associated with many legends and myths, extends over four different regions.

The northernmost region of Indus is the land of glaciers and sky-high mountains, having human inhabitation of unique nature, with complete social isolation and special beauty. There are countless spots in the region considered to be a tourist's paradise.

The second stage of this river begins from below the snowline and continues down through mountains to the city of Kalabagh in the Mianwali district of Punjab. All along this part of its course, the river flows into gorges with steep hills on both of its banks and travels through the northern areas and the North-West Frontier Province.

The third region begins where the Lion River comes out of the cage of gorges and gushes into the alluvial plains of Punjab and Sindh, at the juncture of great beauty located at Kalabagh. From here onwards you have the chance of sighting the diving of the Indus Dolphin when you sail on the bosom of the river. On its journey southwards, it flows through the whole of Sindh, up to the city of Thatta where the Indus Delta begins.

The fourth and last segment of the river is its Delta which covers an area of 5,000 sq. km. The mouth of the Indus Delta spreads from Korangi creek to Koree creek in the south-east, crossing a distance of about 200 kilometres. The region is also known for its mangroves.

Besides having its past history of possessing great river ports, such as Debal Bunder, Lari Port, Keti Bunder and Shah Bunder, at the time of the arrival of Dutch, French, Portuguese and English merchansts, this region is also the centre of camel-breeding, an age-old tradition which finds mention in the travelogues of the early occidentals who discovered the sea-routes and brought war ships and trade vessels to Thatta, the then emporium of Asia during early 17th century.

This area also has a number of ancient forts now in ruins but still providing evidence of their past. Somewhere among these ruins there would be the site of Debal Port where the decisive war was fought in 712 between the Arab General Muhammad Bin Qasim and the indigenous ruler Raja Dahar for the ultimate conquest of Sindh by the Arabs.

It would be intresting to note here that the dacoit phenomenon has not entered the territory of the Indus Delta and as such visitors can safely watch how the 2945 km long river falls into the deep sea through innumerable creeks and also enjoy the charm of fishing, yachting and sun-bathing in complete privacy and far from the madding crowds.

Having looked at the long stretch of the land that the course of Indus covers from its origin in the Himalyas to its flowing in the Arabian sea, let us now have a look on the panoramic fascination of the things of beauty along its banks from its deltaic region to its very mouth in the extreme north.

Not situated within the deltaic region but not far away is Karachi, the largest metropolis in the country, the

port city and the biggest industrial and business centre, which because of its international and inter-city communication links also becomes a starting point for journey through the Indus valley.

In fact, a number of historic sites, associated with the people who live in the land dominated by Indus, which has been changing its course, has an easy access from and can be conveniently reached from Karachi. Such sites include the Makli Matara, the Dumlotti wells of the British days, the Baloch tombs and the Chowkandi graveyards.

Then, there is the ancient town of Thatta and close to it and around the Makli hills are the famous mosques built by Muslim rulers and the large necropolis, with tombs of several saints.

Returning to the deltaic region of Indus, it is divided into innumerable creeks, some of which flow into the Indian territory before entering the sea. We can visit the Jangisar ferry near Jherruk town in Thatta district. One can see the Indus in one piece only at Jangisar ferry (a place where people cross the river both ways), because further south, the river gets divided into creeks.

Alexander had reportedly crossed the Indus from at least two points. One of them is mentioned as Patala. Researchers have been in search of the site where Patala was and some believe that is must be located around Jangisar ferry. Jangisar has yet another importance. It is a river junction for the boats to carry the pilgrims of Haji Ibrahim jo Melo, which continues for twelve days in a distant creek near the Indian border. Usually known as the Fair of Fishermen, this Melo attracts fishermen from both Pakistan and India.

When you come to the Jangisar ferry, you can also visit the Gharo town of Thatta district, with its classical Sindhi architecture. Another attractive site is the Sonda graveyard which is enchanting due to engravings of the limestone's used in the ancient grave.

While trekking the bed of Indus northwards, one arrives at Jamshoro bridge which is the only site where the delicious Paloo fish can be caught. Due to the blockade created by the Ghulam Muhammad Barrage (or the Kotri Barrage) the Paloo fish cannot travel northwards in Indus. This has also caused a setback to the Boat Culture of Sindh.

The tourist will enter the rich land of history, archaeology and architecture while proceeding further to the north. The Laki hills are there with rich cave life, the remnants of Indus Valley Civilization, the ancient torrents and steep mountains as high as the Gorakh Hill, about 6,000 feet above sea level. This is the only site in Sindh having snowfall. Otherwise Sindh is one of the hottest areas in the subcontinent.

The Manchhar Lake, biggest in Asia, and the Runnikot, again the biggest ever stone fort of the world, are located on the right bank of Indus near Sehwan. The Haleji Lake and Keenjhar Lake, with fathomless water are situated in Thatta district and one can see them during the journey.

The most prominent site which comes later on in the north is Mohen-Jo-Daro, the cradle of great Indus Valley Civilization. The constructive as well as destructive character of the Indus river can well be understood after seeing Mohen Jo Daro which was established because of

Indus and now faces the threat of destruction by this river.

Then comes the largest irrigation system of the world based on the Lloyd barrage, commonly knows as the Sukkur barrage, as it is located close to the old Sukkur city.

There is the ancient fort of Bakkhar near Sukkur where great river wars were fought during British days. Across the river from Sukkur is the dreamland of Sad-hobelo and there is also the fascinating site of Satyun jo Asthan (the place of chaste women), ancient Hindu places of worship, still maintained lovingly.

At the Sukkur barrage, the Indus flows into a small gorge and takes a mild curve to travel to the Guddu barrage upstream. The Tori Bungalow built by the British rulers in 1911 is worth seeing near Kandhkot. There is also the city of Shikarpur, with the beautiful architecture dating back some 400 years.

And before the tourist would cross the present Sindh – Punjab border to reach the boatbridge at Mithan Kot, there is the last resting place of Seraiki's great classical poet, Baba Khuwaja Farid.

Jampur comes next upstream. Besides the lush greenery on both banks of the river, the enchantment of this place counts much due to a small village known as Kot Mughlan where Maulana Ubedullah Sindhi was born. The great leader of Indian Muslims was educated at Jampur town in Rajapur district of Punjab.

The town of Jampur is unique in the sense that a large number of beautiful temples are left behind here by the Hindus after the partition of the subcontinent.

The Taunsa barrage on Indus is also a place of

great attraction. The big Muslim shrine in the city nearby is a great meeting place for people – the Baloch, the Sindhis and the Punjabis who all gather there for their religious pursuits.

The Chasma barrage is again a thing of beauty only to be seen. And then comes the city of Kalabagh in the lap of Koh-e-Suleman. Sandwiched between the mountain in the west and the Indus to the east, the old city gives a look similar to Shikarpur so far as its classical architecture is considered.

However, its great attraction lies in its location, nearest to the bank of Indus like the cities of Rohri and Sukkur.

Upstream of the Kalabagh city, nature has showered special beauty over the fast flowing abasin, the Indus which is known by this name in this region. So, Abasin flows from the gorges like a natural fall. On its left is the monumental city of Mari Indus, with a temple of jewels. And going upstream one comes across many people of Pakhtoon origin and of Awan caste busy collecting gold particles from the dark grey sand of Abasin.

There are small tented villages of people known locally as 'Kiriger' who extract gold out of the river bed. I had an opportunity to interview some people engaged in getting gold out of the river. For the members of the Indus Expedition team they demonstrated their skill. After about half an hour of processing the sand collected from the bed of the river, they succeeded in exhibiting the glittering particles of gold in the mass of the grey sand.

They told us that they would mix those gold particles with mercury and after heating up the solution they

would get the gold in solid shape. Their average income from the labour they were engaged in was not more than Rs. 5,000 per month for a family of five, as they claimed.

So, this whole area with unique panoramic features is worth seeing. In this paradise for the tourists, there is a Forest Lodge known as Dui Banda. Constructed in 1975, the lodge located in NWFP provides comfortable accommodation for the tourists. The river flows, in fact, roars past the lodge, which is perched on an elevated site just above. The rumbling sound of the rushing waves of Abasin can be heard in the tranquility of the steep mountains in whole of the area. In the vicinity of the lodge there are a number of natural springs gushing out mineral-rich water.

There is also a grave of a famous hunter of the area, Aziz Shikari (born in 1918, died in 1982). As our guide told us, Aziz Shikari was a very capable guide for tourists, especially those fond of hunting.

The ancient city of Makhad Sharif has a great wealth of classical architecture. The mazar of Noori Pir, a Muslim saint, is situated at an elevation. One has to climb up 182 steps, from the river level, to reach it. The 'Ghora Tarup' is the narrowest gorge where Abasin flows with furious speed. There are some sites here with legends associated with supernatural beings.

The most fascinating place on the way is Khairgarh, a town whose name is said to be associated with the Indus expedition of Alexander, the great. Our guide told us that the Greek conqueror was compelled to camp at this place for a period of three months because the river was in spate and his army could not cross it. Finally hectic strug-

gle, when the troops of Alexander ultimately crossed the river safely, the place was named Khairgarh (safe place).

A small distance from here is a magnificent stone fort built by the Moghul King, Akbar, the great. Quite nearby is the famous site of the confluence of two rivers, the Abasin and the Kabul river. In the lower region of Indus, the second confluence is at Panjnand where five rivers of Punjab come together in Jhelum and finally get absorbed in the Indus.

The different faces of Indus, from Parkutta and Darband to the Indus Delta, are countless, each having a fascination of its own. It is an object of beauty, the Indus, worth seeing, as no words can depict it. It requires an enthusiasm for adventure and an aesthetic sense to enjoy it. Once seen, the glimpses of Indus will continue to flash upon the inner eye of those who have experienced its sight and sound.

THE THING OF BEAUTY WHICH IS INDUS

Mere words cannot portray in full the beauty of the legendary River Indus nor still photographs or for that matter the eye of the video camera. The thing of beauty which is Indus, having innumerable faces, is there fore only worth seeing.

This great river which continues to remain as a live contact between the highest mountains in the north and the fathomless sea in the south in this part of the Asian Subcontinent, has been a craze for the great explorers, conquerors and men of the adventure since time immemorial. As one of the longest rivers of the world, the Indus rises in the land of Tibet from the great Hamalayan mountains having a length of 2945 kilometeres and has an unprecedented annual flow of 209542 million cubic meters, twice that of the river Nile and three times that of the rivers Tigris and Euphrates combined. In Latin, this river is named as SINDUS, in Greek it is called SINTHOS and the Sanskrit language writes it as SINDHU. Later on due to phonetic variations the word, 'SINDH' was pronounced 'HINDH' and 'IND', which resulted in the naming of this river as INDUS by the occidentals. The geo-physical his-

tory of the Indus river is more ancient than even the great world known Indus Valley Civilization which flourished in this part of the world about 10,000 years ago and had its declining bloom during the period ranging between 2500 – 1500 B.C. the vestiges of human habitation in the Indus Valley date back perhaps to about 70,000 years. And while the archaeologists of the world are still not sure as to why the Indus Valley Civilization declined, which happened to be an unprecedented development of the third millennium, the studies in geology suggest that the mighty waters of the Indus were the cause of this great destruction. So, the waters of the Indus are witness to the rise and fall of many civilizations, cultures, empires and religions. The time is passed, the civilization vanished and cities ruined, but the legends live on. Therefore, the people who live off the banks of the Indus river could be considered to be living encyclopedia of history, tradition, culture and languages prevailing from time to time in the Indus Valley. And it is strange to see that these people of the Indus still have some links with the past.

It was in the fact the central idea which inspired some good people to organize Expedition Indus 1989-90 which was aimed at documenting both the Indus as well as the people inhabiting its banks and preserving the prevailing legends in the immediate vicinity of this legendary river. The purpose of the expedition was also to study the cultural, sociological and anthropological aspects of the life on the Indus banks and promote a sense of adventure, exploration and research among the people of Pakistan. Since the Indus is very lifeline of Pakistan today, it was all essentially necessary on the part of the organizers and

sponsors as such provided to serve their national interest. The idea materialized and as such of the expedition to serve their national interests. The idea materialized and provided us with a unique opportunity to see with our own eyes 'the thing of beauty' which is the Indus.

It so happened that on one fine morning while I was passing from the corridor of Tughlaq House (where the Sindh Secretariat is seated) for the purpose of news-hunting, that I came across Kalim Lahari, Deputy Secretary Sindh Culture Department. He was equally in a hurry with his official business. 'Would you and Badar Abro like to trek down the Indus river in boats along with us from Attock to Keti Bandar?" was his abrupt question and my spontaneous answers was, "Oh yes, of course." He said, "Okay, you both may come in contact with me." We withdrew our handshake and proceeded on in opposite directions. I informed my friend Badar Abro, a writer and journalist about the fascinating offer by Mr. Lashari and found him most enthusiastics about the voyage.

So, it was Friday the 3rd day of November last, that we found ourselves at Khair Garh, about 2 kilometers from Attock where the Kabul river and Abasin meet. It was the first day of the 22-day expeditions. The members of the expedition team twelve in number with Kalim Lashari as its leader and Ishtiaq Ansari as its Deputy Leader, included Badar Abro and myself as writers and journalists. There was Azam Jaffer, an expedition expert, Karim Memon, the video master; Mohammad Ali Qadri, photographer, Zubair Farooqi and Shabbir Abbas Naqvi, two mountaineers, and three young energetic expeditionsts Intikhab Hussain Shah, Iftikhar Baluch and

Nadeem Kamerddin. Khalid Samo and Arshad Hussain drove two chase vehicles on the bank of the river while we sailed our two rafts into the legendary waters of the Indus river. The two rubber boats propelled by engineers were named 'Noori' and 'Moriro'. Both the names had an historical and cultural background. Noori was a fisherwoman heroine of Sindh's greatest poet Shah Abdul Latif Bhittai and so was Moriro, a fisherman hero of a folk tale told by the great poet of the Sindhi language. On the first day of our expedition we were supposed to travel down to Khushal Garh in Kohat district of the NWFP.

The surrounding area where river Kabul and Abasin meet had a natural beauty difficult to express in words. The rising sun and its rays were glittering on two different surfaces of water with different colours. The Indus waters looked pure, white and transparent while there was silt visible in the flow of the Kabul river. It was quite smooth sailing in the beginning when we started from the side of Kabul river but when we entered the area of the meeting point of two waters, our rafts were jolted like small toys. Our navigator Totee Khan whose full name was Sadd Bar Gul Khan, was an exceptional fisherman of the area and had plenty of experience in steering his way out of gushing waster flowing over the rocky bed of the river. It was the jurisdiction of Peshawar district, our guide told us, and soon he pointed out to the magnificent fort getting visible at some distance - the Attock Fort. After about half an hour of sailing we stopped at the historical fort built by Moughal Emperor Akbar the Great in the mid-sixteenth century. The stone structures of the fort, though demanding repairs, were looking strong enough to

endure the onslaught of a few more centuries. The Attock bridge was equally beautiful and a piece of classical work by the engineers. Here on the right bank of Indus was situated the ancient town of Khairabad with architectural structures of old-style solitary temples and renovated mosques. Our guide told us that Alexander the Great has crossed the Indus river from this place 'safely', and it was only because of it that this place was named Khair (safe) Garh (place). After visiting yet another historical settlement of 'Mallah Tolla' we sailed on to Khushal Garh, where we had a night safety.

On November 13th which was the 11th day of our expedition we entered the present territory of Sindh at Kashmore and passed our boats from the boat-lock of the Guddu barrage. The Indus had started flowing into the vast plains of alluvial sand and clay downstream Chashama barrage and the scenario of Sindh on river banks gave the same look. However, the places worth seeing in Sindh were Mohen Jo Daro, the citadel of the great Indus Valley Civilization on the right bank of the river about 28 kilometers from Larkana city, the ancient town of Shikarpur which was built by Daudpotas of Sindh as far back as in 1616 A.D, the last resting place of the former prime minister of Pakistan, the later Z.A. Bhutto at Garhi Khuda Bux about 22 kilometers in the north-west of Larkana, the Tori bungalow near Kandh Kot constructed by the British officials of the Sindh irrigation department in 1911 A.D. The mazar of Bilawal Shaheed in Dadu district, the mosque of Khudaabad and Sehwan which as a while is an area of great historical importance having in numerable ancient sites worth seeing. We had an opportunity to be

hold the magnificent pre-historic Runni Kot near Sann town in Dadu district. It is one of the biggest forts of the world and UNESCO authorities have agreed to award it the status of a world heritage after Mohen-Jo-Daro, the Makli graveyard and National Khirthar Park of Sindh on the last leg of our vovage of the Indus was the charm we derived to see in the Indus Delta, the tail-end of this legendary river where it is divided into innumerable small creeks before being absorbed into the ocean. The historical city of Thatta which was once upon a time the biggest river port of Sindh especially at the time when the occidentals had set their feet on this land. It was during the very early days of the sixteenth century A.D. that the Portugese, Dutch and English people came to the port of Thatta for trading purpose. The remnants of some other ancient ports such as Lari Bunder, Debal Bundar, Aurange Bunder were also witnessed by the team of the Expedition Indus which finally arrived at Keti Bunder on the second last day of the voyage i.e. November 23rd. From here onwards we sailed in the sea waters through narrow creeks up to the Port Qasim where huge sea vessels were moved on to receive two tiny rubber boats with saluting sound coming out form their towers. The two rafts of Expedition Indus hoisted the flags of Sindh Culture Department and the Pearl Continental Hotels who had sponsored the expedition while the chairman of Port Qasim and Mehtab Akber Rashidi, Secretary Culture Department of Sindh gave us a colourful reception.

Besides sight-seeing and documenting the Indus, the expedition team accomplished a valuable task of extensive exploration and research during 1500 kilometers

of voyage thereby preserving a unique recorded material in the shape of 50 video cassettes, 200 colour transparencies and print films and 30-hour long interviews with a large number of the Indus inhabitants. It was also observed during the 22-day expedition in the bed of the Indus that some ancient tribes of peoples still make their abodes on both banks of the river in Punjab and Sindh, who entertain myths and preserve legends having some vital historical links with the world's oldest civilization of the Indus. Secondly, the people living in the valley with a higher degree of civilized life speak almost the same language with slight variations such as Hindko, Seraiki, Punjabi and Sindhi. Thirdly, if an extensive and comprehensive exploration is conducted in to the Indus Valley, we can have plenty of the sites with remnants of the Mohen Jo daro Harapa civilization particularly on the right bank of the Indus.

However, the most painful aspect to come to light during the expedition was the question of the very survival and water flow of the Indus river. It was observed that every now and then there was acute scarcity of water in the river more due to the structure of dams and barrages built by the inhabitants of the river for their advantage. It is advisable for them to restrict their needs just to prolong the life of the river an abundance of water should be allowed to flow into its bed. It was also observed that the flow of the Indus water downstream by Kotri Barrage which is being considered by some people as wastage was essential for abstracting the phenomenon of the drastic ecological changes likely to take place at the tail-end of the river in case the flow stops completely.

However, the Expedition Indus 1989-90 was a big success mainly because never before has any team of foreigner or locals had the chance to pass from Dacoit Territory in the Indus belt, which we did. It was despite the fact that we were welcomed by the armed beasts with volleys of bullets from the left bank while we were sailing on the right. So we were untouched, safe and full of the enjoyment of adventure while passing from the hot bed the river.

DECLINE OF BOAT CULTURE

As we entered into the territory of Sindh at Kashmore, the officials looking after the law and order in the area advised us not to move any further in the bed of river since there was horrible menace of dacoits in the riverine areas of Indus. We knew it already but had made up our minds to carry on the expedition in the hot territory of the dacoits. So, we declined to accept the good piece of advice by the Sindh government officials. However, they tried again and again to convince us that it was not without much danger to pass from Khairpur area where about a dozen gangs of the outlaws were operating, and that the riverine areas of larkana district were more dangerous while the Dadu area was the main hide-out of the outlaws, and so on and so forth. They also cited some precedents and told us that not long ago they had loaded the small boats of a foreign expedition on trucks and had allowed them to sail in the river only downstream the Kotri barrage. But when they found us determined tŏ go ahead, with our expedition they offered us a strong police scort to accompany us. But we returned this offer of theirs too

thinking that it might provocate the pirates further more and thus decided to continue with the voyage empty-handed, unarmed and alone. The composition of the team to pass from the dacoit territory was therefore reshuffled and only locats were allowed to sail in the boats led by Kalim Lashari, the leader of the team and Ishtiaq Ansari, the deputy leader. And when the expedition team passed from the area of Khairpur and Larkana districts, its members were greeted by the bursts of the Kalashnikovs from the left band of the river while we were on the right. So, we were unhurt, mainly because the width of the bed of Indus here was over about on mile, much more than the range of the Kalashnikov. Thus the members of the expedition team safely arrived at a village Balhreji near the world-known archaeological site of Mohen jo Daro. However we really enjoyed the air of an adventure during this voyage, and prepared the documentary films of this part of Indus which no previous expedition has ever been able to. The experience, however, suggested that the officials were right and that none but dacoits ruled in the riverine areas of Indus. The first sensation of a peril came when 'Noori', one of the two rubber boats had bursted out downstream Guddu barrage after dashing with a standing vessel on the shore. The life-jackets of course came to our rescue although we were not far away from the bank of the river. This accident delayed work of our expedition considerably and it was only in Sukkur that 'Noori' was repaired. yet another jerk of danger was endured by the team of Indus Expedition upstream the boat-bridge of jampur in Rajanpur district of Punjab when 'Mariro', another raft had gone out of control and the gushing water of the river had swept

it away towards the boat-bridge. Here again we were fortunate enough because our boat instead of dashing with the wooden structures or the iron bars of the bridge sailed out of an outlet between two huge boats on which the bridge was constructed. The fisherman present in the area came on rushing to rescue us taking it for granted that our boat had been droned. The third such hazardous experience, during 1500 kilometres of voyage in Indus from Attotk to Port Qasim came when the tiny boats entered into the sea-zone and in one of the creeks near Keti Bunder, the wooden plates in the bottom of boats struck off the metallic frame which caused two holes in 'Moriro' and the water filled in, thereby creating acute danger of sinking of the boat. Anyway, we managed to overcome all such dangers and steered out our rafts up to Port Qasim as per schedule.

On the way, right from Kashmore to the Keti Bunder in Sindh, the conducted about behaviour of the river exploration and studies by the expedition revealed interesting results. Firstly it was found that the Indus had moved westwards about 65 miles averagely during one thousand years. "When Alexander the Great came to Sindh about 524-25 B.C, the Indus flowed about 50 miles in the east of sehwan. And when the Arab General Mohammad Bin Qasim intended to cross the mighty Indus, he found it flowing at the distance of 14 miles in the east of Sehwan, said Taj Sahrai, an expert of history and archaeology of Sindh during on interview recorded by the expedition team at his Dadu residence. Narrating about the wanton course of this whimsical river, Sahrai further told that there were two courses of this river upstream the old

capital of Sindh the Alor, in the olden times. one of the two rivers-the Sarswati which was named as Hakro in Sindh later on disappeared in the desert of Cholistan and thus was called," The Lost River". In its southern part, the Hakro disappeared in the Thar Desert creating on eternal drought conditions in the south-eastern parts of Sindh. Besides it there was yet another course of Indus known as 'Kumbh Dariya' flowing from the midst of today's Khairpur district near Kotdiji. This stream was later on divided into two brooks, the one flowing from Larkana area in the north - west of Mohen jo Daro, and taking eastern side of Khirthar range of mountains ended up into the manchhur Lake while the other stream flowed torwards Sakrand, Daulatpur Safan and Naushahro Feroz taking the route which today is the National Highway on left bank of Indus. The other river used to flow in the Kandhkot area, he told, which while touching Shikarpur, Begari region, Warah and other western regions of Sindh finally drained into Manchhur lake located in the lap of Khirthar mountains. Yet another flow of this river known as 'Manjhal' used to flow infront of Nai Mohan near historic Runnikot and irrigated the region in which archaeological ruins of Amri are located". This reminded us of the theory of an eminent geologist and world-known scholar professor Maneck Pithawalla who has observed in his famous book on Indus, that," there in not an inch of ground, so to say, in the valley, which has not, at one time or the other been flooded by the Indus and discarded by it". So, it is true, again in the words of Pithawalla that "Sindh, indeed, is a gift of Indus". The learned writer while narrating the geological history of Sindh writes, "For its birth, it has mainly

depended upon the upheaval of the extra-peninsular mountains, the Hamalayas. How these stupendous mountians rose out of the ancient sea, and how they brought into being the two flanks, the Burmese yomas in the east and the suleiman-Khirthar Mountains in the west, is a marvelous story. Incidentally the Indo-Gangetic basin came into being. Even before this stage of the Hamalyan upheaval, the earth movements which took place in Peninsular India during the Cretaceeous age, caused a bulge in the our face of Sindh and there came on this surface the Cretaceous rocks in the laki range, the most ancient geological formation yet met with in this province. This was Sindh's first appearance on the earth about 60 million years ago... The last phase was fluviatile, marked by the mancchar formation of the Siwalik age. This was the age of mammals. The Sindh gulf was then replaced by valley streams which completed the work of filling in many a bay and lake, till ultimately the sea was completely withdrawn, leaving the central valley for the Indus river to flow into". Today the length of this river in Sindh with all windings in 580 miles, about a third of its total length, and nearly 380 miles as the crow flies. The significance of this legendary river was such that sacred hymns were dedicated to the Indus waters by the Rig Vedic poets. A Sindhi sage of Rig Ved namely Sindhuksht had composed the following verse on Indus:

"Flashing, whitely gleaming in her mightiness,
She moves along her ample volumes through the realms,
Most active of the active, Sindhu unrestrained;
Like to a dappled mare, beautiful, fair to sec,
Rich in good steeds is Sindhu, rich in cars and robes

Rich in nobly fashioned gold, rich in ample wealth,
Rich in lush grass,
Rich in lovely wool,
Rich in sweet syrup".

So we continued to move along this river which has blessed Sindh with both its history and geography. We were supposed to document the bed of the river, the human settlements, old and new on both its banks as well as the people inhabiting on its bossom or on its two banks. During such activity of exploration, we recalled Mirza Kalich Beg, the translator of Sindh's ancient history Chachnama as saying that, "Everything in Sindh is a monument, from the tumbling ruins of Mohen jo Daro to the intricately designed tombs of Makli". So, when we landed on the right bank of Indus opposite Kandhkot where our hosts had made arrangements for our night stay in a rest house built by the British rulers in 1911 A.D, the Rest House in itself was really a monument. Generally known as Tori Bunglow, this rest house maintained by the sindh Irrigation department had a great Bath quite similar to that of Mohen jo Daro. Its pond was filled by the water from a well and was covered a ceilings. The place was fit to be used in both the hot and cold seasons. The old structures of Tori Bunglow were both spacious and worth seeing. There was a mysterious mark inscribed on he brick masonary of the rest house which was explained to us by our guide. He said, 'this mark shows the height of a tallest man named Jhamoon Dayo who lived here during the days of British rule in Sindh. The·tall man was asked to stand up by this wall and this mark was inscribed at a point where his head reached". And when we measured

that height, it was 13 feet and 4 inches. "Was he so much tall a man", we asked. "Yes" our guide said and told that when he died, the British officials tried their best to take away the dead body of Jhamoon Dayo for preserving it in some museum, but his parents did not agree and now you can find his grave in the town of Ghous pur near here. We thought, if the editors of the Guinea's Book of Records had this information, they would have declared Jhamoon Dayo as the tallest man of the world in the beginning of the 20th century. It is recalled that the present tallest man of the world Alam Chano is only 8 ft and 3 inches. Later on we moved on to behold the largest irrigation system of the world which is the Sukkur barrage. There, the historic island of Sadhbello with temples of Hidus made of marble gave a look of a dream land. It fascinated our vio master Karim Memon and the photographer of the expedition Mohammad Ali Qadri. Both these young men recorded yet another historic monument known as 'Satyun Jo Astan', the palatial buildings of Rohri, the tomb of Adam Shah and beauty of lab-e-Mehran besides many other things of beauty. Most of our camera films and video cassettes were consumed when we landed in shikarpur city which is 378 years old. The supreme beauty of architecture and wooden carvings on the doors, walls and windows engaged our team for many hours. It was however noted with a touch of pain that many new owners of the old buildings were getting inclined to sell out some of the most beautiful gates and wooden structures to the wealthy people in Karachi and else where on very high rates. This process was destroying the very grandeur of Shikarpur. The expedition team later an visited Garhi Khuda Bux, the

last resting place of the executed prime Minister of Pakistan late Zulfiqar Ali Bhutto and recorded an interview of a "Pesh Imam" of the mosque Haji Mehmood Bhutto, who had given bath to the dead body of the charismatic politician of Sindh and Pakistan. And then came Mohen jo Daro ruins, the remnants of the great Indus valley civilization. Hevering steep on the immediate right bank of the river, the Stupa of Mohen jo Daro attracted our attention from a very long distance while sailing in the bed of Indus. The expedition after documenting many other monuments on both banks of the river including Kotdiji, Makhdoom Bilawal's mazar, the mosque of Khudabad arrived at Sehwan where the team stayed in a rest house built on a historical place known as Kafir Kot. The day after we were in the world's biggest pre-historic fort about 18 kilometers from sann town of Dadu district, It was the Runnikot. Its stone wall measuring about 20 miles long, resembles much to the wall of China. This ancient fort and its architectural structures were only worth seeing. The Expedition had the privilege to document a pre-historic cave in the Laki Hills which was named as Bizon Cave by the locals. First time this cave was explored as for as 60 meters deep with the help of power-generator and a high voltage bulb. The explorers found three more caves inside the main cave and discovered evidences of human inhabition in it. The Kai, Naing Sharif, a site of seven caves known as 'sat Ghari', Gabar Bund, a pre-historic dam and many other monuments were documented in the way still we reached the most fascinating part of river, the Indus delta, where Indus is divided into innumerable streams and falls into the sea.

On the way, right from Kashmore to Thatta we witnessed to our utmost concern the conspicuous abscene of the fishermen community along with their big and small boats. On inquiries we were told that two fundamental factors had destroyed the very boat culture in the tail-end of the river: the dacoit phenomenon and the acute scarcity of water in the Indus. In this context we were taken to some newly built villages where we saw the fishermen of Indus working as peasants. They told us that their boats along with the oars had been confisticated by the law-enforcing agencies during repeated anti-dacoit operations and that due to the construction of Kotri barrage the Palo fish had become extinct, It was therefore that they had left Indus and had been settled on its banks to plough the land as Haris. A fisherwoman told the interviewers of the expedition team that when they had first arrived on the shore to live permanently, all of their family members fell sick. Naturally they were the boat people and were accustomed to live on water, so they required same time to get adjusted on the shore. "Now we have disposed of our boats and those amongst us who were great carpenters and experts of making boats are growing crops on the banks of this river', an old man cried. He asked us to suggest to the authorities to provide them with basic amenities in their new villages. "There is no way out for us but to live on the shore since the water has stopped coming in the river and the business of the fishing had faded away", was a reply from yet another old fisherman. A member of our team sighed and said, "The old man and the Indus have parted their ways, alas".

We had also experienced an acute shortage of wa-

ter while trekking in the bed of Indus downstream Sukkur barrage and it was therefore that we had to take our boats on our shoulders at many places in the way for want of even 3-feet deep water which could easily sailed our tiny boats. This situation further aggravated after Kotri barrage and there we saw with our own eyes the sand drifting to and fro in the bed of the greatest Hamalyan river, the mighty Indus. And when we arrived at Jangisar ferry downstream Thatta, we saw the sea water present there. We arrived at Keti Bunder after a night stay at Garho town of Thatta district, and found it a desolute place, with few wooden huts, half a dozen small shops, and nothing else. When we interviewed a number of old men of the area, we were told that long before Karachi had become a municipality, the Keti Bunder enjoyed that civic status and was one of the biggest river ports of Sindh having trade links with Iran, India & Cylone, Gulf States, Saudi Arabia and Egypt etc. But it was mainly due to the construction of the dam's upstream Indus that the sweet water stopped reaching here. The year 1963 proved to be the last straw on the camel's back. Therefore most of the people inhabiting here were shifted to Garho town of Thatta, Ibrahim Hyderi of Karachi, and other far off places. Except for fishing no trade was left for the people of Keti Bunder where once upon a time a huge industry of boat-manufacturing existed. We were told that about 20,000 people lived in Keti Bunder at the time of the partition of the subcontinent whereas today the population of this small hamlet of fishermen is hardly 1000 souls. The drinking water was the biggest problem for the people of Keti Bunder till during the days of PPP government in seventies, when the UNI-

CEF assisted in installing an underground water pipeline drawing water from a canal in the Thatta district. Today, an old private bus, connects this ruined port of Sindh with Karachi while the metalled road lies under sea water most of the time. The bus takes start from Lee Market in the morning and arrives here in the evening and restarts its journey way back to Karachi the other morning.

After visiting "the most famous port" of Sindh, the mention of which is often made in every book written on Indus by Europeans as well as local writers, we sailed off to Port Qasim through creeks of the sea and crossed the area of Indus Delta with signs of dejection on our faces. However, we were delighted to see that huge ships had been moved at Port Qasim to welcome our two tiny boats at the termination of our Expedition and Mehtab Akbar Rashdi, Secretary Sindh Culture Department as well as Admiral Akbar Khan, Chairman Port Qasim Authority were present there with messages of goodwill from Sindh Governor Fakhruddin G. Ibrahim and Federal communication Minister Makhdoom Amim Fahim for the members of the team. With her infectious smile, Ms, Rashdi observed in her speech at Port Qasim: "The proud-looking members of the expedition Indus have developed blakish countenance due to long voyage. But I hope, they will soon regain their colors and will share with us their valuable experiences".

Undoubtedly it was the longest expedition on Indus conducted in the recent years-the voyage of 22 days. It was unique in the sense that it managed somehow or other to document the portion of Indus ruled by the dacoits. Secondly it was the first time that an elaborate documen-

tary was prepared on video cassettes and latest study of the behavior of the river was recorded in words and films for the posterity. The basic conclusions drawn during this expedition were that, Indus was an eternal factor of unification between the upper and the lower Indus valley that is Pakistan of today. There were almost the same racial, linguistic and cultural aspects visible in the life of the people inhabiting its two banks, and that this river can be made navigable for inland transport only if efforts are taken to maintain its perennial flow by allowing some quantum of water from the dams built upstream the river Besides other benefits, it will ensure the very existence of this historic river which is of course the lifeline of Pakistan.

THE DOLPHIN DIVES IN

The Indus gushes out of gorges and enters into vast plains downstream Kalabagh. Here the stream really gives a look of a mighty river and goes on widening its bed quite unbelievably between two of its banks. The report about the width of Indus formulated during the first geographical survey conducted under supervision of a Greek engineer Sky lax, perhaps was considered as exaggerated, therefore, by the authorities in Greece. But when the Macedonian conqueror, Alexander the Great rim self arrived here to cross the river, he was astonished to behold the vast bed of Indus and thus acceded to call it the 'Ocean of Sweet water'. Here, the flow of river had died down considerably and its waters after getting intermingling with alluvial sand and silt remained no more transparent and clean. This river having fall of 16, 946 feet above the sea level near Manasrover lake and about 15,000 feet at Gilgit was flowing horizontally thereby taking zigzag turns by and large.

So, it was the first time downstream Kalabagh barrage that on Indus Dolphin jumped up and dived into the

water and was sighted by the expedition team. On it a member of the team cried with an air of superstition that it was a good omen and therefore the voyage of the day would be accomplished with some remarkable success. Infact, the remarkable success in itself was the sighting of the Dolphin which today has become an extinct species and the wildlife experts have counted the number of this mammal in whole of the river not exceeding 16 yo 20. The camera-men with two video units sailing in inflatable rafts got alert to picturise the 'dance of the Dolphin', but it was the show of few seconds and thus they missed it. However after a few days of voyage in Indus one of the video master jumped up in joy like a Dolphin and announced that he had managed to have a glimpse of the Indus Dolphin recorded in his equipment downstream the boat-bridge of jampur in Rajanpur district of Punjab.

However, it was the 5th day of November and the expedition team had set upon journey from Kalabagh to the Chashma Barrage. After about on hour of sailing we anchored our tiny boats on the left bank of the river where a settlement of gypsies with straw houses and colourful costumes provided a raw material for the documentary on Indus in making. With water-proof clothes and life jackets on our bodies, and he video units and camera equipment hanging in in shoulders we moved on to the people with black countenance and Dravidian features. Locally known as people of Kel origin were infact the old inhabitants of the river banks, who largely depended on fishing and hunting for their substenance. The poverty reflected from their very being, and their kids were fully naked and womenfolk half-naked. Their health visible from their

faces and the general physique was miserable while the people as a whole seldom had seen the light of the twentieth century. A piece of documentary on the life, social behaviour, trade, customs and costumes of those non-muslim gypsies was prepared along with interviews taken from their old men, women and youth. They told us that the Dolphin was a delicious food for them and they always liked to hunt it. But their prey, as they complained, was so scare that only once in a blue moon they use to have a taste of its flesh. An old Kel who named Dolphin as 'Bulhan' in his own language having phonetic similarity with Punjabi, opined that, "Dolphin's" face is like a rat, its tail similar to a fish and the rest of its body resembling with a woman". Here we were told by the locals that hunt for Dolphin will be at peak in December and January since there will be less water in the river. It was besides the fact that there was complete ban on hunting of the blind Indus Dolphin.

The mountanous range of Koh-e-Suleman still continued on the right bank of Indus while we started sailing downstream to reach the Chashma barrage. Our guide told us that in the lap of rocky range lies a site called Kafir Kot where, as a legend goes, lived a prostitute with her palatial buildings, pomp and glory. Later on a muslim saint made that place his abode and there was a tussle between the bad women and the good men. Ultimately, the bad women succeeded in attracting sympathies of the larger sections of people in the area which annoyed the saintly person who through his spiritual power threw the whole palace of the prostitute upside down. There were remnants of some ancient architectural structures and the

area was known as, 'Kanjri Di Mazar'. However, some men of our research team were of the opinion that if the archaeologists excavated the site, they could discover traces of pre-Indus culture from that site. This observation was further confirmed when the expedition team visited the Dargah of Bilot Sharif near Chashma barrage. It was again in the foot-hills of Koh-e-Suleman and the ancient architectural structures stood as a witness to some ancient culture of the pre-Islamic period. The mazar of the saint of Bilot Sharif had all grandeur of muslim architecture but the presence of a lingum stone and a statue of snake in the vicinity indicated to the possibilities of Shiva worship in practice here in the olden times. The pieces of pottery and stone implements discovered during the surface collection in that area convinced the students of history in our team of some traces of the Indus Valley culture in this area.

Anyway, the Koh-e-Suleman ended here and it was the 7th day of November that we arrived at an archaeological site known as Rehman Therhi near Dera Ismail Khan in the NWFP. And it was highly exciting to see that the pottery and terracotta, the figurines and clay bangles, the pieces of Bullock-cart wheel as well as crescent horns of the bull found from the debris of the ruins resembled much with the object-finds discovered from both the Harapa and Mohen jo daro sites. The chowkidar present there told us that the well-known archaeologist of NWFP Mr. Dani had excavated that area many years ago and had also found some seals with pictures of Scorpion and Deer on them. The expedition team later on visited yet another archaeological site on the right bank of Indus near D.I.Khan which was locally known as Gomal Therhi

where the surface collection confirmed the fact that both those sites near there were an integral part of the chain of cities of the great Indus valley civilization of Harapa-Mohen jo Daro period.

So, after discovery of some traces of 5000-year old Indus civilization in the Frontier province and while visiting Kaloor Kot, Piplan and villages of the people of Kel tribe on the way we moved on to our next destination at laiya patan from where we were supposed to reach Taunsa barrage on November 10. We were excited once again to see the diving of the Indus Dolphin atleast thrice in the way. And before reaching Taunsa Barrage we had a unique opportunity to stay a night in the wilderness after losing sight of the scheduled destination. The red sun like the Indus Dolphin plunged into the horizon in the west and the experienced fisherman who was navigating our caravan of two boats declined to continue the voyage any longer in Indus. He said, 'the old fishermen and people living on boats always suggest that enchourage for the boats must be sought before the sun-set and that the boats man must stay the night where the night falls'. Thus we were compelled to stay a night somewhere near laiya ferry on the left bank of the river on an island where there was nothing but tranquility and wilderness. "The art of survival in wilderness was the primary lesson taught to the adventures", the leader of our team said, and we fixed our tents on the sandy bank of river, cooked our food ourselves and entered into the sleeping begs before mid night. It was infact the most unforgetable night of the expedition during which we witnessed the twinkling of the stars in the sky with penetrating light and heard the voice of the

waves of Indus in the calmness of the night. I recalled an English traveller of Indus Mr. Postans writing in 1843 A.D: "The noise of the falling banks of the Indus when heard upon the stream during the calm night resembles the constant discharge of some distant artillery".

Now the Indus was flowing with its mainstream on the left bank and had created havoc with agricultural lands and small as well as big villages of Punjab downstream the Taunsa barrage. The Punjab irrigation staff was very much present on the left bank of the river with their tents and fatigue on their faces while fighting the onward onslaught of the Lion River. A local farmer expressed his grievances against Indus with love, saying: 'This river destroys our lands. But we can not leave its banks since it develops yet another with fertile silt which we begin to plough anew'. The destructive as well as productive character of Indus was quite visible even in district Dera Ghazi Khan where the erosion on the left bank was in full swing. It looked as if the fury of river gathered during its flow from mountanous gorges in the north was being exercised in the south. It did not spare even a mosque the half of which had already fallen into the whilpools revolving near the shore and the remaining half was about to collapse. The people had deserted the whole village leaving behind their places of abode as well as of worship at the mercy of the river. Here the expedition team captured the ferocious face of the river in video camera and rushed on to Jampur in Rajanpur district where the birth place of late Maulana Ubaidullah Sindhi in Kot Mughlan, the archaeological site of Dilu Rai and last resting place of Jadam Jakhar, once the ruler of Sindh during Sama dynasty, were the points of

attraction for the explorers of Indus. The expedition entered into Sindh territory at Kashmore after documenting this whole area between Jampur and Mithan Kot, the last resting place of Seraiki's great poet Baba Farid. The southern most tributary of Panjnand meeting Indus upstream Mithan kot had its own beauty. The Jhelum river gathering all flow of water from four other rivers of Punjab supplemented this great Hamalyian river at a place known as Alipur. It was the second site of confluence after Attock.

SPEECH DELIVERED AT THE COM-PLETION OF INDUS EXPEDITION

The Honorable Chief Guest,
Participants of the Seminar,
Ladies and Gentlemen!

I had the honour to have been one of the 12-member team of the adventurers and researchers who had completed a 22-day expedition of the Indus river in November last and had trekked down the bed of this legendary river right from the point of the confluence of Kabul river and Abasin near Attock in Peshawar district of the NWFP up to the tail-end of the river in Indus Delta located in the Thatta district of Sindh. The Expedition Indus 1989-90 sponsored by the Department of Culture, Government of Sindh in collaboration with same private parties had prepared a full documentary based upon different faces of Indus, its changing courses, the people inhabiting on both its banks, the ancient sites around Indus, the wildlife and environmental factors related to the river on 45 video cassettes and had recorded interviews of the boatmen and nomads, fishermen and experts of irrigation on

audio cassettes the duration of which exceeded 40 hours. The expedition team had also exposed about 200 transparency films and prepared photo-prints on Indus in course of the voyage during which an extensive exploration and research was conducted in the area of operation.

With a background of such studies on Indus river, I, as a journalist by profession, have come here to share the experiences of the Expedition Indus with the learned delegates of the seminar engaged in deliberations on the contemplated scheme of making Indus navigable for introducing an Indus Water Transportation system in Pakistan.

While I wish you all the best in your guest and ambition aimed at evolving new communication line for the socio-economic development of the country, I can not but appreciate the fact that with it you will be reviving the old Indus routes which the Occidentals, and Arabs, Afghans and Moghuls, as well as old inhabitants of the upper and lower Indus valley had pursued in our glorious past when Indus used to be a mighty river. Although I am not on expert on the system of Inland Water Transport which is your subject, I can believe, however, that the contemplated scheme of making Indus navigation will not only provide a better alternate to the existing over-expensive activity of the trade and commerce in the country but will also greatly help in restoring the fast declining boat-culture in the Indus river besides opening new vistas for the indegenous commodities of great commercial significance and will boost up an overall development of the rural areas of Pakistan.

In this context I also feel in the light of the experience of our expedition that in persuit of your goal you

might be confronted by two major impediments in the way, i-e the scarcity of water in Indus and the dacoit phenomenon prevailing in the riverine areas of Indus. The studies conducted by the team of Expedition Indus had revealed last year that the flow of water in Abasin from Tarbella Dam usually stops in the month of December and January and in that case the Kabul river alone fills the lake of Jinnah Barrage at Kalabagh during early months of the year. However, we ourselves noticed that while passing from the area downstream the Kalabagh Barrage in the first week of the November last, we found it difficult to sail our two tiny rubber boats for which about three feet deep water was more than sufficient. Thus the water situation went on aggravating with course of our journey downstream the river. The flow of water was seen diminished by and by at Cashma barrage, laus barrage, and Guddu Barrage so much so that we had to take our rubber boats on our shoulders when we arrived downstream the Sukkur Barrage And when we crossed the Ghulam Mohammad Barrage at Kotri, there was no water at all downstream the Bridge. Then it was only near Jherruk town of the Thatta district that we could find some quantum of water accumulated through seepage from the banks of river and supplemented by the sea-water encroaching upon the dried bed of Indus with oceanic tides. So, the present state of water scarcity in Indus happens to be the fundamental problem for any scheme aimed at introducing the Inland Water Transportation in this region.

However, there could be ways and means to steer out the way through canals and lakes bypassing the bed of river. But with the river can not be made navigable which

I wish could have been the sole objective of the government scheme for which provisions have been made in the Seventh Five-Year plan. In this context, the government headed by the Prime Minister Mohtarma Benazir Bhutto and the department of communications headed by Makhdoom Amin Fahim of Hala might help in evolving an amicable system of systematic release of water from various dams and barrages on rotation basis so as to ensure a perennial flow of water into the bed of Indus. And thus the first great hurdle in the way of inland water system could be removed.

So far as the menace of the dacoits the Sindh area of Indus is concerned, it is yet another problem for your long-cherished dream. The experience gathered by the Expedition Indus in this connection was bitter and the outlaws hiding in the thick jungles of the riverine areas opened fire on the expedition team more than once. This phenomenon as history tells as happens to be very old. The historical accounts recorded by the European travelers in the early seventeenth century A.D often mentions of the menace of the river pirates and their armed skirmishes against the trade convoys. It was as back in 1614 A.D that a European traveller Frey Sebastian Menrigue had lost his guard in such an attack and therefore he had suspended his voyage of Indus for cremating the dead body of the Hindu guard. The solution of this problem however lies in the very scheme of the Inland Water Transport System. Because with it, the area would flourish with trade activity there by replacing the criminal activity in the natural course. In such an atmosphere the outlaws would not find the riverine areas dissolute, barren and unguarded for their

criminal acts.

So, the task into your hands is noble with multi-dimensional advantages. And if it succeeds, all other factors would be overcome consequently.

In the last, I would like to add that the area of Indus Delta can prove to be a great asset not only for providing safer communication lines for the Inland Water Transportation but would also provide for spectacular opportunities for setting up small ports for fishing and other trade activities. The studies conducted by the Expedition Indus in this context also revealed that more than a dozen small parts can be develops on innumerable creeks where infrastructure is already available for the camel-breeding, fishing boat-building, hunting and tourist industry etc. The transport activity in the Indus Delta is also likely to be accelerated further more with realization of the schemes about tourist hotels being conceived by the Sindh Culture and Tourism Department.

So, I once again wish you the best and thank you for inviting me to speak in an esteemed gathering and for listening to my talk with attention.

WATER CASE

(Random articles on water issue of Sindh)

INDUS DRIES UP AROUND SADHBELO

According to the Hindu belief, the sacred Indus does not give way to anybody to walk down to the Sadhbelo tirath. The gurgling river waters protect this holy place from all intruders, ill-wishers and those intending to violate the sanctity of the temple.

But in the year 2000, an unprecedented scarcity of water in the Indus river has overshadowed such a belief and the local people of Sukkur have started walking down to the Sadhbelo on foot especially from the side of the Satiyun Jo A'astan where the bed of river in its mainstream has fully dried up. Whether it is the natural calamity or the machinations of the Man, but the situation is heartening especially for the Hindus.

Secondly, the process of siltation by river around Sadhbelo tirath has also become acute in the recent decades. In early fifties, the level of river happened to be about 12 feet below the surface of the Sukkur city. Today,

it is 3 feet abovc the city level. It is the result of siltation by Indus.

The problem of siltation is also acute around Sadhbelo because this site is located in the upstream of the Sukkur Barrage where the flow of the river is obstructed for the purpose of water distribution in seven canals of this largest irrigation system of the world. So, more siltation takes place when the water stands stagnant.

In the olden times, the Sadhbelo complex of temples used to have two dredgers which conducted dredging around the site for clearing the way of boats to reach the site. But in 1954-55 the then Chief Minister of Sindh Mr Mohammad Ayub Khuhro had sold out those dredgers to the Karachi Water Board. Since then, there is no system available for the clearance of silt around Sadhbelo. It is the main reason why the bed of Indus around Sadhbelo has dried up during current spell of drought.

RENOVATION OF SADHBELLO

A massive renovation of Sadhbello tirath is taking place these days by the Hindu community of Sukkur more so from their own budget. They have organised a four-member Religious Parband Committee (RPC) and assigned them the task of completing the renovation work by June next, as the annual congregation and Melo at Sadhbello is likely to be held by the middle of that month.

The RPC managed by Mr Mangha Ram Mathija, Mr Deewan Chand Chawla, Dr. Jessa Ram and Mr Ratan Chand has earmarked Rs 2 million for the renovation of this complex of the temples.

The new construction work at Sadhbello includes 8 new rooms for the Yatris, 10 bathrooms and 20 lavatories for the ladies, 2 special guest rooms, a Dressing Common Hall for womenfolk, roofing treatment to the
ceilings of the old temples, a water tank (Jal Ashram) with automatic cooling system, 20,000 feet marble work and a park with showers etc.

The Sindh Auqaf department, through a letter, has promised a financial aid amounting to Rs 5,00,000 for the renovation of Sadhbello, but the same had not been received by the functionaries of the RPC till May 1 last.

The members of RPC are undertaking renovation work on Sadhbello Tirath with their own money but not without due permission from the Sindh Auqaf Department as the Hindus have no direct control over Sadhbelo which is otherwise the place of worship for them.

ANNUAL FESTIVAL

The Melo (Fair) of Sadhbelo is an annual feature. Some day in the month of June such an occasion occurs as per Hindu calendar. In the year 2000, the annual festival of Sadhbelo is going to take place on Saturday, Sunday and Monday, June 16, 17 and 18.

The main characteristic of Sadhbelo's Melo is an unprecedented show of non-discrimination among the high and low class Hindus as well
as the Scheduled-cast Hindus, so much so that, they eat from the same bowl filled by the Bhandara (charitable food) of Sadhbelo.

UNJUST WATER DISTRIBUTION

(Speech delivered at SANA Conference 2001,Washigton USA)

We live near Moenjodaro. Our lives are lived according to the myth of Moenjodaro. This beautiful mythology states that Moenjodaro was a city where every settler received a brick and a gold coin from the residents of the city. According to the research of Dr. Michael Johnson of Germany, about one lakh people lived in that city; so a newcomer would get one lakh baked bricks and one lakh gold coins to facilitate his settlement there.

Now the descendants of the same ancient civilization of the Indus Valley are facing great trouble and hardship these days. According to the latest official figures of the Sindh Irrigation Department, during the year 2000, water flowing downstream to Kotri Barrage, the tail end of Indus River, was below the volume allocated in the 1991 water accord (0.725 MF out of 10 MF).

This water accord, which was signed by Jam Sadiq Ali, was unacceptable to Sindh since the basis of the accord was the distribution of the water effective during the regime of Gen. Zia from 1977 to 1982. There was a huge cry in the Sindhi press against the accord. I must

tell you that the Sindhi press has become a very powerful organ these days and it is the most vocal and effective watchdog of the rights of Sindhis. These days, it seems, the Sindhi press is at the forefront in the struggle for the rights of Sindh.

Anyway, when the water accord was signed in1991, we protested it - the irony is that there came a time when we launched a struggle to get water share as per the 1991 accord. So we ended up jumping from the frying pan into the fire. The situation deteriorated further in 1998 and 1999: both the Rabi and the Kharif crops were destroyed. More than 50% of the Rabi crop for the year 2000 was damaged due to shortage of water. This shortage of water has cast a pall over the sowing season of the Kharif crops which is about to start soon in Sindh. There is no water for the cultivation of the cotton crops. The government has imposed a complete ban on paddy cultivation, which surely spells doom for the farmers. Traditionally, the right bank of the Indus has been reserved for paddy cultivation, and more than 70% of the rice exported from Pakistan is produced there. When the Sukkur Barrage was built in 1932 only a single canal, called a rice canal, was allocated for paddy cultivation. So when the government asserted that there was a shortage of water, it was suggested that the 1932 module pattern be adopted. That idea was later dropped due to the lack of water.

The upper riparian tell us that there is a shortage of water due to natural factors like little rainfall and drought. Then we find out that we are not getting any water because the Tarbela Dam is being filled. When we are told that they are releasing water from Tarbela Dam, we are

overjoyed until we learn that the water was diverted through the Chashma Jehlum link canal to Punjab rivers. The greatest Himalayan river which comes from 29,000 feet above sea level has completely dried up at its tail end. The sea has started to hit back in the form of sea intrusion. Thus conditions ripe for dissatisfaction have been created at the tail end of Indus ROBD has not only stopped the flow of water to the lower riprians but also the natural sweet water resources under the right bank of Indus have been destroyed. All this is threatening our sweet water resources. According to a study by M.H. Panhwar, an irrigation expert, the sea has encroached upon the Sindh Coast for 58 miles northwards. It has destroyed fertile lands and created a dissatisfaction process. As far as the delta is concerned, it has been absolutely destroyed. The mangroves yield has started to diminish; we have not tasted Paloo fish in a long time.

We were told that there was a water crisis due to natural factors. Our crops were totally destroyed. Yet the province of Punjab had bumper crops of wheat, rice and cotton. During the previous three years, no doubt, the people of Sindh have realized their rights and requirements of water. The political movement which we witnessed quite recently on the water issue has sent very strong shock waves to the establishment. It was generally thought that after the heat generated by the MRD movement for democracy, nothing could equal the momentum of that era. Yet the quantum of resentment today is almost equivalent to that era's - the MRD movement was a political movement but the issue of water is one of survival.

Effluvium generated from the natural drainage program as well as from the process involved in the re-

moval of salinity and water logging for whole of Pakistan is being drained out into the sea through Sindh. We cannot understand this phenomenon. How can that poison be transported through Sindh? The sad part is that they are using the natural sweet water resources of Sindh as a vehicle for flowing this highly toxic material. For example, the West Nara used to be a natural irrigation canal of Indus. When there were no rains, the West Nara used to feed the Manchar and Hamal Lakes, which would then flow into the Indus River. Now the salinity and water logging problems of Punjab, Balochistan and Northern Sindh have run into the western Nara. They call it NNVD, or Main Nara Valley Drain these days. And it has been destroyed and contaminated completely.

Hamal Lake, the second largest lake after Manchar, has been destroyed too.

So you see, the northern side of the right bank of Indus has been destroyed as well. With the destruction of the Hamal and Manchar Lakes, the sweet water resources of the left bank and the tail end of Indus have completely dried up. Our agriculture as well as the fragile ecosystems have been destroyed.

While Sindh abounds in natural resources like coal (200 billion metric tons of coal in Thar) and holds great promise for the future, its other resources as well as its agricultural lands are being destroyed. Meanwhile the miseries of the people of Sindh have been compounded by the Karachi City Government. The army installations occupy 70% of Karachi, while 25% is under federal control. The remaining percentage is in the hands of non-Sindhis. Thus lies the state of Sindh.

ISSUE OF WATER

The Government of Pakistan claims that it is the natural factor, say global warming etc, which has created scarcity of water in Pakistan's major river Indus and, that the sufferer is not only Sindh but, the Punjab as well, besides the NWFP and Balochistan.

Here is the viewpoint of the Sindhis:

We claim that whatever water is available in river Indus during prevalent drought is being taken away by the upper riparian Punjab (majority) province of Pakistan. The proof : In the year 2000, all crops of Sindh were destroyed due to water scarcity but, Punjab harvested bumper crops of wheat and cotton. They produced 22 million metric tones of wheat and 11million bales of cotton. The Punjab sold out surplus wheat to Sindh, Balochistan and NWFP at inflated rates.

According to the official figures of Sindh Government, only 0.725 MAF of water flowed in the tail end of Indus river in Sindh as against commitment of 10 MAF in the 1991 Water Accord signed both by the Sindh and Punjab. During 365 days of the year 2000, the water flowed to

the tail end only for 18 days. The IUCN (International Union for Conservation of Nature) – Pakistan chapter recommends at least 27 MAF of water downstream in the tail end to protect ecology of Indus Delta including Sindh coast.

Minister for Irrigation in Sindh Government Mr. A.N.G.Abbasi's statement is on record of Pakistan's newspapers when he said " It was not merely a theft of water, it was a robbery on legitimate water share of Sindh by the Punjab". He then resigned from the post. With him Governor of Sindh Air Marshal (Retired) Azim Daudpoto and Minister of Agriculture Sindh Mr. Iftikhar Soomro also resigned in protest against usurping water share of Sindh by the Punjab.

The Punjab has military might and, a population more than combined population of Sindh, Balochistan and NWFP besides developed agriculture and 80% sweet water reserves. Sindh has only 15% sweet water reserves and, 71% arid area.

We appeal your good-self to side with the poor but legitimate heirs of Indus river the 75% of whose flows were allocated to Sindh as per 1945 Water Accord effected by the British India between Sindh and Punjab.

Wheat crop irreversibly damaged

ACUTE WATER SHORTAGE IN SINDH AS PUNJAB GETS 3 % MORE THAN SHARE

The wheat crop in Sindh seldom receives adequate irrigation waters in January and February, which stunts the growth of the crop, drastically reducing yields one-fourth of their potential. This year it will be even worse.

The annual closure of water in Sindh's canals continued from January 6 to 21 for the government's desiltation programme but thereafter, the water was yet to flow.

The Sindh Irrigation authorities said there was an overall scarcity of water in the country and since the water level of Tarbela and Mangla dams had gone down, the farmers of Sindh would ofcourse experience some difficulties. The authorities did, however,promise to supply water on rotation basis, but that also has not happened.

Meanwhile, water levels at Guddu and Sukkur barrages were alarming low and not even a single drop was released for Kotri barrage in the tail-end atleast for a fortnight. There was an outcry by Sindh farmers who demon-

strated in the streets for water with dying plants of wheat in their hands. Since March 1, some water graced the desilted canals but damage to the wheat crop is already done.

On the provincial level, Sindh and Punjab exchanged counter-allegations of water theft but no relief is in sight for Sindh's wheat crop.

The Sindh irrigation minister and secretary were on record saying that Punjab had taken 3 % more than its share of water for which a formal complaint would be lodged with the Indus River System Authority (IRSA).

On February 28, the IRSA and Sindh Irrigation minister announced that water was available in country's reserviours for only one month and, therefore, there would be no supplies in the B S Feeder and Phuleli Canal in March. Replying to a question, the Sindh Irrigation minister voiced no commitment for water during the forthcoming Kharif crop of Sindh.

It is pertinent to mention here that on the eve of the wheat-sowing season in Sindh, the provincial irrigation authorities had warned farmers that they should sow wheat cautiously because there would be a shortage of about 10 % during Rabi season. But for all practical purposes, the shortage of water surpassed 25 per cent.

Commenting on the prevailing condition of the wheat crop, a peasant of Larkana village said, " We shall probably cut the ripened plants of wheat by sitting on the ground, because the crop will not develop to its full-length this season."

WHAT IS " HISTORIC SHARE " OF WATER ?

The term, " historic share " of water has no history. Such a term has never been used even in the text of the 1991 Water Accord.

However, when the deliberations on the Water Accord were going on in 1991, the apportionment of water between Punjab and Sindh was to be decided.

So, it was resolved to draw an average of water apportionment between Punjab and Sindh from 1977 to 1982 for the sake of an exercise just to make the required apportionment possible. The irrigation officials of Punjab, however, regarded it as " historic share " of water.

So, according to the so called, " Historic Share" of water, the province of Punjab was awarded 48 MAF of water while Sindh got 46 MAF. But when the 1991 Water Accord was finalised, the province of Sindh was awarded 48.76 MAF of water. It is besides the fact that Punjab had a greater quantity of water in the accord, 55.94 MAF (almost equal to 56 MAF.)

But even then, the Punjab was not happy to see that as per 1991 Water Accord, the Sindh province was drawing more water than what the Punjab had been consuming during the years 1977 to 1982, i-e 48 MAF.

It is therefore now that when the shortages of water are being shared between Punjab and Sindh provinces, the province of Sindh was claiming more water than the Punjab did during the period of 1977-1988. Thus the Punjab has started saying that Sindh was drawing more water than it did in period from 1977 to 1988. Therefore, the water distribution should be done from now onwards on the basis of the " Historic" share, i-e only 46 MAF to Sindh, and that's all.

WATER CRISIS RESULT OF NON-IMPLEMENTATION OVER 1991 WATER ACCORD

The prevailing water crisis in Sindh and subsequent inter-provincial tension considered by some political analysts as a cold war on water between Sindh and Punjab was the direct result of non-implementation of the 1991 Water Accord.

The Sindh irrigation experts believe that Sindh received at least 30 per cent less water than its due share, as per Accord, in 2000. It was officially notified about four months ago, during December, that Sindh would get 10 per cent less water than its share due to a general shortage in the Indus river system. For all practical purposes, the shortage was more than 25 per cent.

Experts in Sindh also believe that the figures pertaining to the scarcity of the irrigational supplies in the Indus river system were exaggerated by the IRSA authorities. As a matter of fact, the shortage was not as drastic as was being portrayed. For example, if the Mangla reservoir

was lowered by 13 feet only. This was not unprecedented as Mangla dam has witnessed a shortfall of inflow six times since its inception, from 1967 to the year 2000.

Secondly, the Punjab has taken 23,000 cusecs of water from the Indus through Chashma-Jhelum Link Canal during this Kharif season but has released only 5000 to 7000 cusecs for Sindh in the recently ended Rabi season. This was 'water-way' robbery, plain and simple.

However, the 1991 Water Accord provides for the readjustment of irrigational supplies as per requirement of water between the provinces.

Since the Chenab and Jhelum are early rising rivers with inflows of water from mid-February to the middle of August. Water supply to Sindh for Kharif season in April should have been adjusted from those Punjab rivers. When the late rising Sindhu Darya is filled from mid-June to mid-November, its water could have been diverted to the Punjab for its Kharif crops which are sown about two months later than in Sindh.

Despite these facts, there are people demanding the accountability of WAPDA for releasing water to Sindh from Punjab's share. These water-grabbing chauvinist elements ignore the national interest when they talk of water distribution in the country. Sindh's experts therefore, suggest a broad-minded national approach on water issues, assuming that Sindh is also a part of Pakistan.

A consensus has, therefore, developed in Sindh demanding a high-level inquiry into causes of an acute shortage of irrigational supplies for the last 10 months during three crops of Kharif, Rabi and current Kharif. They have suggested that unless the Punjab and its bu-

reaucracy comes clean, manipulations to the detriment of national rehabilitation would continue.

In this context, the public statement of Dr Shafqat Jamote, federal Agriculture minister is on record. He had accused the IRSA of mismanaging river waters of water due to which the current water crisis has assumed disasterous proportions. He said, now the affairs of IRSA were being looked after properly and there would be no problem in future.

The real problem stems from the fact that there is a serious dispute about total river flows, high and low and average. The 1991 Water Accord was based on a lie which exaggerated the main flows of the Sindhu river system. This is the reason why, under the current conditions, the crisis management system has fallen flat on its face. The transfer of waters has succumbed to provincialism with the national interest being relegated into the background.

Experts insist that this year water shortage has been exaggerated by the Upper Riperians who have used it to force the Sindh, NWFP and Balochistan into accepting Kalabagh Dam. With careful management of our water resources, this crisis could have been averted to the benefit of all, experts said.

SUKKUR BARRAGE: LARGEST IRRIGATION SYSTEM OF THE WORLD

If you trek down all canals, tributaries and water-courses of the Lloyd Barrage, you will cover a distance equal to go around the globe twice.

Constructed at Sukkur in 1932 A.D this largest irrigation system of the world feeds seven canals covering 1028 miles, tributaries running 1071 miles and 5196 miles of the watercources. The old and new watercources of the Sukkur barrage run for in all over 50,000 miles and irrigate over eight million acres of land in the central Sindh .

The main structure of the Sukkur barrage having 66 floodgate hovers over a gentle curve of the Indus river with Rohri on the left and Sukkur on the right bank. The surroundings of this unique irrigation system of the world are extraordinarily rich in beauty.

In its immediate upstream is Sadhbelo, a Hindu temple with marble structures built on a rocky island in the bed of Indus. The Landsdown bridge with classical engineering skill, the Satiyun Jo A'stan (graveyard of women symbolising chastity), the palacial buildings of Rohri and lush green palm-tree gardens all around create a panoramic scene.

Dr. H. T. Sorley, a European Sindhologist who compiled The West Pakistan Gazetteer in late fifties observes : " Untill the nineteen twenties, Sindh lay at the mercy of the Indus river which played 'hide and seek' with it, changing its five hundred-mile course at will, unleashing calamitous floods, ravaging the fields every now and then and leaving a trail of misery, pain and squalor behind the river's wrath. But with the coming of the Lloyd Barrage, the river was made to surrender its power before the largest ever irrigation system of the world."

He is very right in his observation. This barrage has not only saved Sindh from the wanton onslaught of the mighty river but has also revolutionised the agriculture of Sindh. When the East India Company operated in Sindh only one million acres of land was under cultivation through natural inundation canals of the river; the Kalhora rulers increased the quantum of cultivation to the tune of three million acres through digging of 'Gha'ars' - the indigenous canals carrying Indus water to the farmlands; but when Britishers came to Sindh they raised the figure of cultivation to eight million acres by constructing world's largest irrigation system on Indus.

The story of this gigantic barrage in itself is very interesting. It was in 1855 A.D. that the British rulers of

Sindh took two important decisions of introducing railway transport in this part of the subcontinent and to construct a barrage on Indus for boosting up Sindh's agriculture.

The construction of the railway line from Karachi to Peshawar was undertaken without any problem, but the scheme of the construction of Sukkur barrage was delayed due to lack of consensus by the concerned quarters including the local bureaucrats and agriculturists of Sindh.

In 1855 A.D. an army engineer of the British administration Captain J. G. Fife prepared a comprehensive report based on a proposal to construct a barrage on Indus at Rohri. (Sukkur and Rohri are the twin - cities separated by Indus .) The original author of the proposal considered this scheme good for Sindh. His proposal was approved initially but soon it went into the cold storage of the Bombay government and a number of controversies erupted for and against the scheme.

The time passed by but Mr. Fife's opinion never wavered and he continued insisting on construction of the proposed barrage for the good of Sindh while his proposed scheme remained unimplemented. In this process as many as seventy-seven years passed away. Meanwhile Captain Fife attained the rank of Lieutenant General and passed away from this world without seeing his dream come true.

Ultimately it was in 1932 A.D., that on pattern of the Esna barrage on Nile (Egypt), the construction of Sukkur barrage with four canals on the left and three canals on the right bank was finally completed. The newly constructed barrage was named after the viceroy of Bombay as suggested in a resolution adopted by the local

council of Shikarpur.

The architect of Sukkur barrage was Mr. A. A. Musto, a man from Indian Engineering Services. He built 1.6 klm long barrage which was five times the length of the London Bridge. The total cost of this project was calculated at that time to be Rs. 20 crore (i-e Rs. 200 million).

" The area covered by this barrage is about one quarter of the area of England. While maximum discharge of the Thames river at London Bridge is 15,000 cusecs, the Eastern Nara canal of the Sukkur barrage alone discharges 13,602 cusecs. The width of Suez Canal at the surface is 200 feet while that of the Nara canal is 370 feet", writes Dr. H. T. Sorley in the West Pakistan Gazetteer.

Today this gigantic structure has grown 76 years old. It has ofcourse manifested the fatigue of the age as its floodgate number 31 finally gave in on December 19, 1982. Thank God it was winter otherwise had it been the high flood season of Abkalani, the whole structure of the largest irrigation system of the world would have been drained down the river plunging whole of Sindh into abyss of destruction.

Anyway, the failure of the floodgate number 31 of the barrage was not the failure of the engineering skill with which this wonder of the world was built. As a matter of fact the architects of this barrage had already warned that while the structure was made to stand unwavered for half-a-century, its custodians will have to take all necessary steps for its prolonged life after the period of warranty.

But our bureaucrats manifested cold indifference even to such a unique monument still in working position resulting in damage to its thirty-first floodgate in 1982 while in 1984 its Rice canal gate (middle leaf) was damaged grossly. Since then the work on replacement and reinforcement of the floodgates of the barrage was undertaken involving huge budget.

The inadequate maintenance of this great structure has over the last half - a - century created yet another problem - the twin menace of waterlogging and salinity. It has destroyed millions of acres of the fertile lands of Sindh. In fact , it was also not the failure of the engineering skill of the architects of the barrage ,as they had suggested to the guardians of this irrigation system to dig seepage canals for draining out the waterlogging from its command area.

But once again we overlooked the engineering notes of the architects of the barrage; and today the very structure of the Sukkur barrage starts vibrating even with discharge of ten lac cusecs of water whereas the architects of this barrage had designed it for discharging atleast 1.5 million cusecs. So still it is high time to save the largest irrigation system of the world by devising ways and means for its befitting maintenance.

QUEST FOR SO-CALLED DEVELOPMENT LEAVES RIVER INDUS DRY

In the name of 'development', the upper riparian Punjab which is predominating the hierarchy of the Islamic Republic of Pakistan has left the greatest Himalayan river Indus dry at its tail-end. An ecological disaster has taken place in the deltaic region of Indus where the process of desertification has already destroyed millions of hectares of fertile land which happens to be the only source of livelihood for millions of pcasants and fisher folk of Sindh.

The history of water war waged by the ruling Punjab against the lower riparian Sindhis is more than one and half century old. In 1830, when the Punjab started developing its agriculture, the legitimate water share of Sindh was usurped. Prior to 1830 AD, Sindh used to get 150 MAF of water in the tail-end of its river. Today, not even a single drop of river water is being allowed to flow in the tail-end of Indus. The official figure of water flow into the tail-end of river Indus during 2000-2001 is zero (0.725

MAF). With stoppage of river water flow to the sea, the ocean has started hitting hard at the Sindh coast thereby destroying the sweet water aquifers of Sindh through the process of desertification. Besides, the Palo fish (Clupea Ilisha) providing livelihood to the fishing communities all over Indus has become extinct, the seventh biggest forest of Mangroves is depleting, the production of shrimp has been drastically curtailed (by about 70%) while the area of Sindh coast is being eroded by the sea as against centuries -old phenomenon of enlagement of the Indus Delta.

This all is being done in the name of the so-called 'development'. And the Pakistan establishment is adamant on constructing the Kalabagh Dam on Indus, which is the economic lifeline of Sindh. While, the lower riparian Sindh is facing water famine and acute food shortage, the Pakistan Government has already started constructing the Greater Thal canal by diverting water of Indus beyond the share of Punjab to cultivate an additional 500,000 hectares of land owned by the military bureaucracy of Punjab.

The British rulers in India had brought about 1945 Water Agreement between Punjab and Sindh and had allocated 75% of Indus waters to the lower riparian Sindh. Two years after in 1947, the Punjab deviated from that agreement with advent of Pakistan as a result of the partition of subcontinent.

The Punjab which had already violated the verdicts of Anderson Commission of 1935 as well as The Indus Rao Commission of 1941, had disobeyed the resolution of water dispute between Sindh and Punjab through Akhtar Hussain Commission of 1968, the Fazal Akbar Commission of 1970, the Anwarul Haq Commission of 1981 and

the Haleem Commission of 1983.

In 1991, Punjab dictated its terms on Sindh during the government of a Punjabi premier Nawaz Sharif thereby compelling Sindh to accept only 48 MAF of Indus water instead of 75% of Indus waters allocated to Sindh by the British rulers. But the same Punjab deviated from the 1991 Water Accord arbitrarily in 1996 curtailing Sindh's water share drastically.

Now, Sindh is being informed that the Federal Government of Pakistan was planning to develop the industry in the country by generating more and more electricity by storing water of Indus in the territory of Punjab at Kalabagh, Mangla and Tarbela. And, if anybody resists such ruthless decision, the military action is directed against it in the name of 'integrity and solidarity of Pakistan' labeling them of being Indian agents. There is no democratic order in the country to allow people to raise their voice of any grievance.

The representatives of the World Bank, Asian Development Bank, IMF and some international donor agencies visited the tail-end of river Indus in February, 2002. On this occasion, the Irrigation Minister of Sindh Syed Ali Mir Shah told the foreign guests that due to acute water scarcity 122,360 acres of agricultural land had been submerged under sea water in two districts of Thatta and Badin of Sindh. The minister briefed the foreigners' team and told them that the dams and other irrigation schemes on river Indus had reduced the flow of river water from 181 billion to 25 billion cubic meters during floods. And about 120,142 acres of riverine forests had been destroyed on the river banks; the Mangroves spread on 1,850 million

meters were reduced to mere 1,000 square meters. Such a news story was published by the daily DAWN, the most distinguished newspaper of Pakistan.

On the local front, the indigenous population of Sindh inhabiting the mountains in the west is migrating to some other areas, there is famine in the legendary desert of Thar, the mass exodus is taking place in the Indus Delta, the thick jungles of Indus are being chopped off by the military in the name of destroying the hideouts of dacoits, the riverine belt is dry where livestock is being perished, the crops of central Sindh are being destroyed one after the other, the Indus plains of Kachho are under acute drought and the whole of Sindh is very much under conditions of calamity. Even the people of the mega city of Karachi having population of 12 million are not getting potable water. The 150 lakes of Sindh have been dried up, the fisher folk of legendary Manchhar lake are migrating to urban centers where they have no other business but to beg for the sustenance.

So, both the Nature and Man have turned averse to Sindh. The monsoon this year has only showered drought on Sindh, its Thar desert, the mountains, Kachho, the riverine belt as well as the Indus Delta. The failure of rains has created calamity in most of the arid areas of Sindh (about 71%). There was a single shower in the Thar desert on June 28. Since then not a single drop of water has blessed Sindh from the skies. The British rulers had set a tradition of declaring Thar as calamity-hit area automatically in case there were no rains by July 20. But, the Pakistan government is waiting for the month of September to pass, and only then the files would be moved to declare Thar as calamity-hit area. Such a process would take

THE WATER WAR

The water war was thrust upon Sindh by the Punjab but despite its unpreparedness, Sindh put up a resistance which compelled the aggressor to be on the defensive. The battle is still on, leaving behind casualities in Sindh which happens to be the battlefield. Who wins the war is yet to be seen, but where from comes the aggression, has been identified beyond any doubt.

The initial skirmishes begain in 1999. Then, it was a war of words. A few exceptions apart, the powerful press of Pakistan was on the side of the Punjab. The Sindhi press, however, confronted with courage and competence and mobilized the public opinion to such an extent that the sitting Governor of Sindh, Air Marshal (retired) Azim Dadupota, resigned. He was followed by Sindh Irrigation Minister, Mr. A.N.G. Abbasi, as well as Minister for Agriculture, Mr.Iftikhar Soomro.

"It was not merely a theft of water, it was a robbery on Sindhi's water share by the Punjab," said Mr. A.N.G. Abbasi shortly before vacating the chair which was later on occupied by Syed Amir Ali Shah of Sindh

Abadgar Board.

But, the position of the present cabinet of Sindhi ministers under Governor Mr. Muhammad mian Soomro is not altogether different from their predecessors. There were rumours in the capital of Sindh that a secret inquiry was in progress against the sitting Minister for Irrigation perhaps because he was getting too vocal on the water issue. The Governor of Sindh Mr. Muhammad mian Soomro was reported to have approached the Chief Executive of Pakistan General Pervez Musharraf to spare him for a World Bank job, but his request was not acceded.

All this happened only on the government's side. So far as the political pulse of the greater Sindhi masses was concerned, some independent analysis believed that it could have been even worse than the MRD movement of 1983 if the political agitation on the water issue had lingered on for long is Sindh. Their analysis was based on results of the Water March initiated by Awami Tehrik led by Mr. Rasool Bux Palijo as well as Water Protect by an alliance of JSQM- MQM (Jeay Sindh Qaumi Mahaz- Mutahida Qaumi Movement) in and outside Karachi.

Many analysts were of the opinion that while the visible motive behind the MRD movement was restoration of 1973 Constitution and ouster of General Zia, the masses of Sindh, as a matter of fact, had fought vigorously and spontaneously just to take revenge of Z.A. Bhutto's execution (on April 4, 1979) four years ago. The agitation on water issue, according to them, had much greater relevance as it was directly affecting millions of Sindhis in the nook and corner of Sindh where famines-like situation

prevailed and, the people were not getting water even to drink, what to talk of the irrigational supplies for agriculture.

It was perhaps because of that the federal government sent a hawk general, Zulfiqar Ali Khan, chief of WAPDA, well-known for his pro-Kalabagh Dam stance, to announce in Karachi during the SZABIST seminar in early May that "the government of General Parvez Musharraf had decided to lower down the Tarbela Dam even to the dead level to supply water to Sindh for its Kharif sowing." Such an announcement, of couse, defused the political agitation on the water issue on some extent, yet the pangs of people caused by the water famine never ended.

However, one of the causes of water agitation being defused of water agitation being defused in Sindh was, in fact, was not only the government's decision to provide irrigational supplies to Sindh during Kharif sowing. More than that, there was a phenomenon of blind march in an unknown direction. The dilemma of Sindh today is the lack of data on various crucial issues. Sindh, more than anything else, needs a think-tank which could provide a database to Sindh based on which a strategy could be formulated.

Our politicians had no accurate idea about the requirement of water for Sindh's agriculture, the drinking needs of its people, the water requirement of Indus Delta for preservation of coastal ecology and so on and so forth. It was therefore that they simply demanded "water" saying that "we have no water." They could not present the case of Sindh comprehensively in terms of compensation

which Sindh deserves for an irreparable loss cause to its agriculture, the rehabilitation of people who have migrated due to water shortages and the damage caused by environmental disaster created in the tail end of the river, etc.

Today, the situation is such in which neither the Federal government nor the government of Sindh has ever conducted any study on the requirement of water to flow downstream Kotri barrage for supporting life in the tail end of the river. It was a prerequisite underlined in the 1991 Water Accord which was never realized even after the lapse of a decade.

All these factors apart, the common folk in the Indus Delta, the plains of Indus, the mountains of Sindh as well as That Desert have become casualty of the water war. The fate of the prisoners of water war is also hanging in balance. They are either in the jails or in the process of prosecution. The Karachi administration acted to ruthlessly, and summoned the notorious police officers from Mianwali, known for their expertise in giving physical torture, to exhibit their abilities while striking at the peaceful demonstrators during water war in Malir district of Karachi.

So, while the wounds of war are still fresh, Sindh has not as yet received its legitimate share of water. The water is stopped, blood flows. What lessons the Sindhis will have to learn from these initial stages of the water war is to equip themselves with the weapon of database, prepare themselves to mobilize the greater masses in every nook and corner of Sindh, and a fight a war of words on the media front, If these lessons are not learnt, we might

not win the war.
Bhittai has said:
"Come to the Major Battle Though many small battles fight And never cease to sweep away passion, Fight, and destroy the foe" (Translation by Elsa Kazi)

So far as the upper riparian Punjab is concerned, it has learnt throughout the ages not to learn any lesson from history.

INDUS DELTA

(Articles on Indus Delta & Concept of Fairy Service)

CONCEPT

Promoting Community-based Eco-tourism in Indus Delta Through KARACHI-MUMBAI FERRY SERVICE

Coastal ecotourism has often been identified as a possible response to the economic problems faced by peripheral coastal communities. It can be seen as tourism based on the sustainable use of the natural marine environment. The range of activities involved include marine and coastal-based activities such as viewing whales and dolphins, seabird ornithology, diving, leisure boating, yachting and sightseeing, as well as land-based activities such as visiting marine and coastal interpretation centers, viewing coastal seascapes, beach walking and rock pooling.

Globally many coastal communities are now turning to marine ecotourism as part of their regeneration strategy. Eco-tourism is responsible travel that encompasses natural and cultural resources, while conserving and sustaining environments and local economies. Ecotours recognize the priceless value of natural, cultural and heritage resources that serve to relieve the stress borne of

the frantic pace of modern life.

Pakistan Coast especially its Indus Delta region is unique in the world in biodiversity, natural resources and its indigenous communities. It is a typical fan-shaped delta, built up by the discharge of large quantities of silt washed down by the Indus River from the Karakoram and Himalayan mountain ranges. The present delta covers an area of about 600,000 hectares. It is characterized by 17 major creeks, innumerable minor creeks, mud flats, and fringing mangroves. About 260,000 hectares of the delta are covered with mangroves. Indus Delta ecosystem is rich in nutrients that provide a nursery and an early feeding ground for many varieties of shrimp and fish.

There is great scope for introducing and promoting tourism in the Indus Delta. The shallow creeks, 17 of them, have mangrove plantations of varying sizes, and in some locations a diversity of mangrove trees can be observed that provide resting places to the exotic marine bird fauna. Besides the mangrove ecosystem and the range of shrimp, crab and other fisheries, the delta is also home to a large population of jackals. The Delta islands also offer a sanctuary for resident and migratory bird species. The marine waters surrounding the islands are also visited by bottlenose and humpback dolphins.

Historically Delta had remained a bastion of civilization with more than 12 major seaports from where sea trade was carried out with a large number of countries. The present day Indus Delta is home to a number of very ancient archeological sites. These sites can be a major attracts for the tourists. Besides, the season of the deltaic region is pleasant the whole year. The sea breeze blows all

year round except during local disturbances in winter and summer months.

Need Analysis

Present day Indus Delta with all its biodiversity, natural livelihood resources and culturally rich communities is faced with a severe threat of degradation. Due to a number of causes including drastic reduction in the River Indus flows in the delta after commission of dams upstream, the deltaic natural and livelihood resources are reducing with the passage of time. The agriculture and livestock livelihoods have already reduced and presently a fisheries livelihood is also under severe threat of reduction. This situation coupled with no alternative livelihoods available for the coastal communities has threatened the economic survival of the local communities. Besides, unfortunately the government policy makers are also paying no attention towards the seriousness of the situation and no steps are being taken either for allocating sufficient fresh water quantity from Indus River for the delta and arresting the other causes of degradation of the sixth largest delta of the world.

Pakistan Fisherfolk Forum [PFF] is the national level representative civil society organization of the fisherfolk communities of Pakistan [See annexure for details].It is engaged in both advocacy as well as community development activities. PFF has intends to initiate pilot project for promoting eco-tourism in Indus Delta. PFF understands that promotion of tourism in Indus Delta is important due to two reasons:

Due to natural livclihood resource degradation the

deltaic fisherfolk communities of Indus Delta are facing poverty and economic hardships. The promotion of eco-tourism would ensure alternative livelihoods for the fish-erfolk communities of Indus Delta.

The tourism would also help in highlighting the importance and issues of the region as unfortunately the region despite its biodiversity and natural livelihood and other resources has never received importance at the pol-icy level.

Overall Project Objective

Promoting ecotourism in Indus Delta as an eco-nomic alternative for the local communities to rapidly de-creasing fisheries livelihoods

Specific Objectives

- To initiative eco-tourism boat service in Indus Delta
- To study the potential of eco-tourism in the Indus Delta region
- To provide training to the local communities including youth in eco-tourism skills
- To initiate advocacy campaign with the policy mask-ers on eco-tourism potential of Indus Delta

Justification

The livelihood resources and biodiversity of Indus Delta, the sixth largest delta in the world are under severe threat. Agriculture and livestock livelihoods have almost degraded. The only livelihood source i.e. fisheries is faced with severe threat of depletion as fish catch is drastically decreasing leaving millions of the coastal communities

vulnerable to poverty and hunger. Pakistan Fisher folk Forum [PFF] is continuing its advocacy campaign to bring sustainability in the fisheries livelihoods through policy, practice and attitudinal changes. However, given the vulnerability of the only natural livelihood resource in the deltaic region, PFF is of the view that it is high time that due consideration should be given to the alternative livelihoods for the coastal communities to prevent economic and livelihood disaster feared as a result of sudden possible collapse of fisheries livelihood resource.

PFF believes that ecotourism can be one of potential alternative livelihoods for the coastal communities of Indus Delta Pakistan. The ecotourism has importance as alternative livelihoods as because it not only ensure income for the local communities but also promotes the conservation of nature. PFF strongly believes that carefully planned and implemented tourism development can be a sustainable economic alternative as well as a successful conservation strategy—one that provides jobs to local people and, by its reliance on healthy ecosystems, offers a powerful incentive to preserve the environment. Therefore, this Ecotourism Promotion project in Indus Delta would help forge a direct link between the economic benefits from ecotourism and the protection of biodiversity.

Project Activities

1. Initiating Eco-Tourism Boat Service

While realizing the importance and the great opportunities of tourism in Indus Delta the key activity which PFF intends to initiate is an eco-tourism boat ser-

vice. For this purpose a new boat would be purchased and a captain would be hired for the boat. Initially, very nominal charges would be fixed for offering boat trip services to the national as well international visitors to the Indus Delta region.

2. Study to "Explore Ecotourism Potentials and Improve Facilities in the Delta"

As the Indus Delta, despite its biodiversity, has remained a neglected area by the policy makers, no concrete study has been conducted for identifying the real potential of Indus Delta. Therefore, the project key activities include a study to examine the tourism potential of Indus Delta. A tourism research consultant would be hired to carry out the study. The study would not only to further identify the potential of the tourism but also prepare suggestions for infrastructure and other related development plans to improve eco-tourism activities in the region.

3. Tourism related Training to the Local Communities

The project activities also include training to the local youth as well as other community members to impart them with the skills as they can initiate their own tourism initiatives or can receive employment in the local level new tourism initiatives. For this purpose, help of different agencies engaged in tourism promotion in Pakistan including Pakistan Tourism Corporation and Sindh Tourism Department would be sought. The resources person/ experts of those agencies would be hired, who by using their training manuals, would train the local communities to enhance their skills of dealing with the tourists includ-

ing the national and international tourists. Similarly, the educated but unemployed youth of the area would be selected and trained in the tourism sector to enhance their capacities and capabilities to the extent that they receive jobs as tourism guides in the deltaic region of Pakistan.

4. Preparing and Printing of Eco-tourism promotional publications

Preparation and printing of publications aimed at promotion of the tourism in the delta region is also one of the key project activities. For this purpose, two publications would be made. The first publication would carry detailed tourism potential and places and with color photographs of the area. The publication material would be prepared by a local eco-tourism consultant. This publication would be dispatched to different organizations and individuals in Pakistan as well as abroad to make them aware about the tourism potential and opportunities in Indus Delta.

The second publication would be in a form of small but beautiful color brochure about the tourism opportunities in Indus Delta. The brochure would also be prepared with the photos of the tourism sites as well as details of the tourism potential. The copies of these brochures would be provided to the hotels of the whole country to make them available to the national as well as international guests/tourists

5. Organizing National Indus Delta Eco-Tourism Conference

Organizing a national level Indus Delta Ecotourism Conference is also a key activity to be carried out.

The conference would be aimed at bringing policy makers and the local communities on one platform to enhance facilities and options for further increasing eco-tourism in the area. The conference would be organized in the last quarter of the project to ensure that all the activities of the conference including the research conclusions and even PFF experience of initiating a small scale tourism operation in the Delta region should be shared with the policy makers to make them to divert their attention on increasing the facilities for the local communities to increase their tourism potential.

Monitoring & Evaluation

Project monitoring would be one of the key activities to track the project successes and failure so as to learn lessons and improve the project activities and performance. For this purpose the staff would be responsible for preparing quarterly report of the project. Besides, a monitory Committee comprising PFF office-bearers, local elected representatives and community members would be formed which would continuously monitor the process of implementation of the project with short intervals. Project evaluation would also be carried out in the end of the project.

Project Beneficiaries

The coastal communities of Indus Delta would be the direct beneficiaries of the project. The project would result in ensuring an alternative livelihood option for the coastal communities who are faced with growing poverty and vulnerability as a result of degradation of fisheries resources. The local, provincial and federal government

policy makers, private institutions working on the development of eco-tourism in Pakistan would also directly and indirectly benefit from the project activities especially the projects eco-tourism promotional publications and study to further improve the eco-tourism options and facilities in Indus Delta.

Project Sustainability

The possibilities of the sustainability of project activities even after the project funds are over are inbuilt in the project activities. The earnings received from providing boat facilities to the local and international tourists would be pooled in a separate fund, which would be used in running the project activities once the project budget provided by the donor is over. This amount would be used in a way that not only the present level of the project activities including boat service, eco-tourism trainings, publication and conferences should continue but more eco-tourism related activities also take place with the passage of time.

Project Budget

S. #	Budget Heads & Line Items		Unit Cost	No. of Units	Grand Total
A.	Activity Cost				
	a.	Study on Identification of eco-tourism potentials and improving eco-tourism facilities in Indus Delta	200,000	1	200,000

	b.	Eco-tourism training to the local communities	50,000	6	300,000
	c.	Preparation and publication of eco-tourism promotional Publication	150.00	1,000	150,000
	d.	Preparation and publication of Eco-tourism Brochure	50.00	2,000	100,000
	e.	Indus Delta Eco-tourism Conference	200,000	1	200,000
	Total A = 950,000				
B.	Administrative Cost				
	a.	Project Officer	15,000	12	180,000
	b.	Tourist Guide	12,000	12	144,000
	c.	Boat Captain	10,000	12	120,000
	d.	Boat Helper	7,000	12	84,000
	e.	Stationary	2,000	12	24,000
	f.	Communication and Postage	3,000	12	36,000
	Total B = 588,000				
C.	Capital Cost [Equipment & Other Direct Cost]				
	a.	Tourist Boat	2,000,000	1	2,000,000
	b.	Computer and Printer	40,000	1	40,000
	C.	Furniture	Lump sum		35,000
	Total C = 2,750,000				
	Maintenance Cost				
D.	a.	Fuel for the boat	30,000	12	360,000
	b.	Boat Maintenance	2,000	12	24,000
	Total D = 384,000				
Grand Total (A+B+C+D)					4,672,000

Project Logical Framework

Annex: I

Pakistan Fisher Folk Forum [PFF]: An Introduction

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
Overall Objective	Promoting ecotourism in Indus Delta as an economic alternative for the local communities to rapidly decreasing fisheries livelihoods	Ecotourism activities initiated as alternative livelihood	Number of community members engaged in eco-tourism activities	
Specific Objectives	To initiative eco-tourism boat service in Indus Delta To study the potential of eco-tourism in the Indus Delta region To provide training to the local communities including youth in eco-tourism skills	Boat service initiated Study on the potential of eco-tourism conducted 100 Local communities and youth trained in eco-tourism Ecotourism promotional publication and brochure published	Boat purchase receipt Boat tour log book List of Visitors Boat Visit tickets Training reports/ participants list brochure printing bills	Law and order situation remains stable in Karachi No major disaster hits the region

Specific Objectives	To initiate advocacy campaign with the policy maskers on eco-tourism potential of Indus Delta	National Indus Delta Eco-tourism conference held	Published Brochure copies Conference report Monitoring & Evaluation Reports	
Expected Results	At least 50 community members are engaged in eco-tourism related activities by the end of the project 100 community members including youth become trained in eco -tourism related skills Eco-tourism potential of the region is properly and professionally identified and recommendations for improvement are prepared	Number of community members engaged in eco-tourism activities No of boats diversified from fishing and engaged in eco-tourism activities Number of community members having received eco-tourism training Availability of Study report on the potential of eco-tourism with recommendations Level and number of	Lists of community members engaged in eco-tourism List of boats engaged in eco-tourism Training reports with participants list Study report hard and soft copies Newspaper clippings and documents of government programs	Project funds are made available on time Project activities are carried out on schedule Community is willing to take part in eco-tourism training

Expected Results	Government recognizes the eco-tourism potential of Indus Delta	government decision to make official initiatives of developing ecotourism in Indus Delta		
Activities	Initiating Eco-Tourism Boat Service Study on Further Improving Eco-tourism Facilities in the Region Tourism Training to the Local Tourism Guides and communities Preparing and Printing of Eco -tourism promotional publications Organizing National Indus Delta Eco-Tourism Conference	Means Purchase of boat Staff hiring Hiring trainers & community members selection for eco-tourism training Organizing trainings Awarding consultancy to a consultant for preparation of Indus Delta eco-tourism publication and brochure Awarding consultancy to a consultant for preparation for conducting study on Further improving eco-tourism facilities in Indus Delta Booking venue, inviting resource persons, participants for the conference	Boat purchase bill Staff appointment orders / TORs Staff salary slips Bank statements Training Reports and expenditure details community participants list Consultancy TOR Publication & Study Report Soft / hard copies Conference report Conference expenditure details / vouchers	Trainers for providing eco-tourism training are available Consultant to prepare eco-tourism promotional material is easily available Consultant to conduct study for further improving tourism facilities in Indus Delta is easily available

The fisherfolk communities of Pakistan, comprising of about 15 millions populace, are among the poorest and most deprived population of the country. Large-scale degradation of fish resources, the only livelihood resources of these communities, due to unsustainable exploitation coupled with defective governmental policies has largely added to their already augmented vulnerabilities. Besides, the fisherfolk communities have also been facing host of socio-economic problems especially lack of basic amenities of education, health and safe drinking water. Moreover, living near the coast and other water bodies the fisherfolk communities have always remained vulnerable to the natural disasters including cyclones, floods, droughts etc.

Pakistan Fisherfolk Forum [PFF] was launched on May 5, 1998 by a large number of fisherfolk community representatives and NGO activists as a result of full day deliberations in a seminar organized in Karachi to discuss the threats to livelihoods of fisherfolk communities. Pakistan Fisherfolk Forum [PFF] is registered organization.

Since its inception, PFF has been active in the awareness, mobilization and community organization for the protection as well as sustainable management of the fisheries and other community livelihoods through advocacy, participatory research, information dissemination and participatory community development processes.

Vision

Economically empowered and prosperous, socially conscious and organizationally cohesive fisherfolk communities of Pakistan, enjoying historical rights on their

fishing livelihoods and the active participation fisherfolk men and women in the management and conservation of their livelihood resources to ensure sustainability of the resources for their future generations.

Mission

PFF Mission is to mobilize and empower the fisherfolk communities in a way that they organize themselves, with equality and gender balance, for protecting their fishing and other livelihoods; by this ensuring sustainability of the resources. PFF mission also encompasses bringing positive changes in socio-economic conditions of the fisherfolk communities and facilitating attitudinal, policy and legal changes to recognize the historical ownership rights of communities, including men and women, over the coastal as well as inland fishing grounds and fish resources, ensuring their active participation in the management and conservation of those resources.

Objectives

To mobilize and organize the fisherfolk communities dependent for their livelihood resources on Pakistan's coast, rivers, lakes, reservoirs, ponds and other water bodies.

To strengthen the organizational and management capacities and skills of the local CBOs of the fisherfolk communities besides establishing and strengthening PFF units in fisherfolk localities, villages and towns of Pakistan.

To struggle for the livelihood rights of the fisherfolk communities, sustainability in the fisheries liveli-

hoods through advocacy, information dissemination, media campaign and dialogue.

To campaign for deracinating the causes and factors responsible for the depletion in the coastal as well as inland fisheries resources by advocating participatory approach and management systems for the protection and conservation of fisheries resources.

To struggle for the restoration and protection of human rights of the fisherfolk communities of Pakistan including the right to sustainable livelihoods, basic social services, right to life and security as well as right to social and political participation.

To work for the social-economic uplift of the fisherfolk communities and improvement in education, health, livelihoods though participatory community development activities.

To make effort towards minimizing disaster risks faced by the communities through relief , rehabilitation as well as participatory disaster mitigation and management activities in the disaster prone areas.

To work for betterment of the vulnerable sections of fisherfolk communities i.e. women and children especially for the empowerment of the women and the education and health of the children.

To struggle for regional peace and cooperation for minimizing regional hostilities affecting the fisherfolk communities of Pakistan and India in the form of their arrests on the allegations of crossing coastal borders and 'prisoner of war' like treatment meted out with them.

Strategy

PFF has adopted the strategy of mass mobilization and awareness, advocacy, campaigns and community development for achieving its goals. PFF strongly believes in participatory approach of community awareness and development actively involving the local communities and other key stakeholders in the process.

PFF Units

Presently, more than 50 PFF 'units' have been established in a number of fisherfolk villages of Karachi and Thatta coastal areas. Pakistan Fisherfolk Forum is presently recognized as the only national level network of the fisherfolk communities of Pakistan. However, the fisherfolk communities are scattered communities living close to various water and fisheries resources. PFF is engaged in mobilizing and organizing more and more community members to establish more units in different areas, regions and provinces of Pakistan.

Programs

Pakistan Fisherfolk Forum has been providing institutional and social services to the communities under its following programs:

Advocacy & Awareness Services [AAS]

PFF has been involved in advocacy and awareness campaigns on a number of issues concerning the livelihoods of the fisherfolk communities of Pakistan. Those issues include: depletion of fish resources, lack of sustainable fisheries policy, over exploitation of fish resource by

deep sea trawlers, negative impact of the use of harmful nets as well as contract system in fishing livelihoods, degradation of Indus Delta due to reduced fresh water flow downstream Kotri Barrage, arrest of fishermen Pakistan and Indian law enforcing agencies and prisoner of war like treatment meted out with them etc.

Community Organization Services [COS]

PFF is engaged in mobilizing the fisherfolk communities to organize their local groups and CBOs to work for the solution of the local community problems. So far more than 80 groups/ CBOs have been formed in different fisherfolk localities and villages in Pakistan. Majority of the groups/ CBOs work as the local units of Fisherfolk Forum [PFF], others working as independent groups/ CBOs, receiving technical support from PFF. PFF is also engaged in strengthening those community organizations through trainings which include: organizational management, leadership, effective communication, proposal writing, strategic development, gender and development and other trainings.

Health & Education for Community [HEC]

As the fisherfolk communities lack basic facilities of education and health, PFF is seriously involved in community development initiatives in education and health sector, by providing basic education and health facilities wherever these facilities are not available and supplementing government's facilities in both these sectors wherever such facilities are inadequate. Besides, PFF is also actively involved in advocacy with the local, provincial as

well as federal government to provide these basic facilities to the local communities.

Disaster Management Services [DMS]

The fisherfolk communities are vulnerable to the natural disasters. Especially the coastal communities of Badin and Thatta have been experiencing worst disasters in the form of floods, cyclones and droughts during the recent years. PFF jointly with its partners including Oxfam GB Sindh has been involved in relief, rehabilitation as well as disaster mitigation/management activities in the coastal districts of Badin and Thatta since 1999. PFF is also actively engaged in advocacy processes to sensitize the governments to ensure sustainable disaster management plans for the disaster prone areas.

Natural Resource Management Program [NRMP]

Degradation of natural livelihood resources and ecosystems especially Indus Delta ecosystems, fisheries, forests, agriculture resources etc is the key cause of growing community poverty levels ands social deprivation. PFF is engaged in awareness and advocacy process to sensitize the governments and aware the local communities for the community based management of the natural resources for their sustainability. Besides, PFF is also engaged in community-based initiatives for natural resource conservation including mangrove plantation etc.

Research, Information Dissemination & Publishing Services [RIDPS]

PFF is also engaged in participatory research on

the natural livelihood resources as well as socio-economic and poverty related issues aimed at providing policy guidance/ recommendations in the sector. The research studies are also properly disseminated through conferences, seminars, workshops; publication of research papers .Besides, PFF is also publishing a regular newsletter in Sindhi, Urdu and English which carry research reports and other community based activity reports.

Capacity Enhancing & Cultural Services [CECS]

PFF has adopted two-dimensional approach towards general education regarding community-organization relationship. The PFF's Capacity Building Unit [CBU] is engaged in trainings to the local communities on natural resource management, organization management and other themes, on one hand. While its cultural group Fisherfolk Theatre depicts and by this mean advocates the socio-political issues and educative themes of fisherfolk communities within as well as exterior the community.

Networking / Partnership

PFF through its participatory community development approach has created linkages and partnerships a number of civil society organizations and networks in Pakistan as well as aboard. PFF receives technical as well as logistic support in its struggle for sustainable livelihoods, mass awareness, advocacy, and community development and disaster mitigation / management activities from its following partners named in alphabetical order:
Action Aid Pakistan

Alternatives Canada
Architecture and Development France
Asian Cultural Forum on Development
European Commission
FdH
Green Peace
HANDS
International Collective Support of Fish Workers [ICSF]
IUCN
NOVIB
Oxfam
PILER
PNRDP
SAP Pak
South Asia Labor Forum
SUNGI
World Forum of Fisher People
WWF

COASTAL RESOURCES THREATENED

Karachi: Over-fishing by big trawlers, drastic reduction in the flow of fresh, sweet water of the Sindhu Darya into the delta area, and lack of policy pertaining 'sustainable fishing' by the government count as some of the factors responsible for the depletion of fish along the Sindh coast which has decreased to about one-third. Stretching over 385 kilometers, the Sindh coast offers great potential as a fishing ground in South Asia with coastal waters stretching from zero to 12 nautical miles, the Continental waters from 12 to 35 nautical miles and the Exclusive Economic Zone (EEZ) from 35 to 200 nautical miles.

Since the sustainable fishing policy has never been devised by the government during past half a century, a state of anarchy prevails on the Sindh coast in matters of the fishing rights especially to the indigenous fisherfolk. The Pakistan government in the recent past had concluded an agreement with an American company known as

Forbes Company according to which the company had to invest $460m in three years for the fish catch to the tune of 4,000,000 tons from Pakistan coast. This agreement today is put in abeyance more so due to international pressure by the world fisherfolk.

For the last half century, the land-locked minded leadership has not evolved a 'sustainable fishing policy'. This has led over the years, to an almost free-for-all rape of Sindh's coastal resources. The main reason being that fishing rights, especially of the indigenous fisherfolk were not protected.

The natural conclusion of this policy of neglect was the Pakistan government's recently concluded agreement with an American company, Forbes, according to which the company had to invest $460 million in three years for a fish catch of 4,000,000 tons. The agreement is today in abeyance due to international pressure exerted by the world fisherfolk community.

However, instead of rapid, short-term depletion, even today the big trawlers known as Factory Ships with capacity of stretching nets in an area between one to four kilometers in one stroke are emptying the Sindh waters of big and small fish. About 50 to 60 such trawlers are still fishing in the Sindh's waters. This has given tough time to the small fishing boats owned by the indigenous fishermen whose catch is now one-third of what was used to be. These big trawlers usually violate the rules and instead of fishing in the EEZ, the fish in the EEZ. the fish in continental as well as coastal waters.

These mechanical monsters normally destroy the marine environment and fish habitat by throwing dead fish

back into the sea after sorting the fish catch which have a better market value. The large quantities of the dead fish thrown back into the sea pollute the marine life.

After large, and loud protests, the former Governor of Sindh Lt. Gen. (R) Moeenuddin Hyder took serious note of the rape of the coast. A number of big trawlers violating the rules and indulging in excessive fishing in shallow waters were arrested.

This restrained the big trawlers for about six/seven months. Now the insecurity and pillage has returned once again along the Sindh coast where big trawlers are harvesting fish even in the shallow waters where they are not supposed to fish at all.

Added to the foreign, blind exploitation of our coastal resources, the willful manipulation by the upper riparian of the waters of Sindhu Darya. According to Mohammad Ali Shah, convenor Pakistan Fisherfolk Forum the downstream discharge of Kotri barrage was about 110 MAF of water in the British India era. But with the construction of dams and barrages on the Sindhu and its tributaries, the flow of water downstream of Kotri barrage decreased to about 35 MAF. Even this quantity could sustain the coastal ecology.

The Water Accord of 1991 betrayed the mental block of the upper riparian, why exploit their geographical vantage point.

They recommended that 10 MAF of water flow downstream of Kotri barrage. The blinkered minds just did not accept the ecological imbalance their policies had created in the delta region.

So much so that for all practical purposes, not

more than 5 MAF of sweet water flowed below the barrage on the Sindhu Darya.

This supreme belief in their own ineptitude has been a major setback for the Delta country, which stretches over 5000 square kilometres and has a 200 kilometers opening into the deep sea. Many sweet water fish species have died or are close to extinction.

The seventh biggest mangrove forest in the world has suffered a deathly blow and the buffer between land and sea is fast dying. Shrimp production has suffered the most as it thrives on the fresh-sea water mix and feeds on the mangroves. In addition to the fishing industry, the coastal region has become vulnerable to the onslaught of oceanic encroachments and a process of desertification has begun in the tail end of the Sindhu Darya.

The drastic decrease in fish catch along the Sindh coast, according to Mohammad Ali Shah, has been mainly due to the scarcity of sweet waters in the delta region.

He said, "when the Darya [river] was flowing in all its glory, the effects of the sweet water were felt for about one hundred miles deep into the sea reflecting two different colours of Darya and oceanic waters on the surface. Today the process has been totally [reversed].

The ocean's waters are pushing into the creeks which are basically the breeding grounds." He said, according to research conducted by M.H.Panhwar the ocean's encroachments on Sindh's lands has crossed Thatta and this overall of a natural phenomenon is pushing forward to an area south of Hyderabad.

(November 13, 1999, Daily Star)

ECOLOGICAL DISASTER IN INDUS DELTA

Ecology of the deltaic region of Indus basically depended on brackish water created with a mix of fresh and sweet water of river with oceanic brine. The stoppage of Indus river's water flow to Sindh by upper riparian Punjab has created an ecological disaster in Indus Delta where habitat of mangroves, fishes and other species of sea life is being vanished away, the human populace is migrating from the area and, the very survival of this greatest Himalayan river is at stake.

The greatest Himalayan river Indus emanating from the territory of Tibet passes from Ladakh district of India and enters Pakistan territory at Bagh-i-Darband in the northern areas. It empties itself into the sea through 17 major creeks located in Karachi and Thatta districts of Sindh. The Indus Delta is spread in 5,000 square kilometers with 200 kilometers mouth with the sea. The region of Indus Delta is made through centuries-long process of sedimentation by the river Indus. The human population of the Indus Delta is roughly about a million.

The Punjab started developing its agriculture as far back in 1830 AD. Prior to it, the flow of Indus water downstream Kotri barrage to the sea was 150 MAF. By then, the Indus Delta had grown as the garden area of Sindh while its territory continued enhancing with every passing year at least by 20,000 hectares.

Today, such a quantum of water (150 MAF) is not available even in the whole Indus River System. It is either 114 or 104 MAF. And it has become the bone of contention between Sindh and Punjab during ongoing inter-provincial water dispute.

According to an official figure of Sindh government, the flow of river water downstream Kotri Barrage in the year 2000 AD was 0.725 MAF. It was despite the fact that the 1991 Water Accord stood for 10 MAF of water to flow into the sea while as per an analysis of the IUCN, at least 27 MAF of water was needed to sustain the ecology of Indus Delta.

So, during present water shortages of an acute nature being experienced by the river Indus and the consequent endeavors of both the Punjab and Sindh to get as much irrigational supplies as possible for their agricultural development, or so to say, the prosperity of their landlord class of people, the tail-end of the greatest Himalayan river has dried up almost completely.

Even then there is hue and cry over the so called wastage of water flowing downstream Kotri barrage to the sea. Those who consider water flowing downstream Kotri barrage as wastage overlook the Indus Delta, the tail-end of the river. And it is the requirement of the International law on the water streams that if any water stream does not

reach its tail-end, it would be considered as 'dead'. The acute scarcity of water in Indus is the slow poisoning of the river, the beginning of the very end of the very river Indus.

With it, the sea has started hitting back. And, according to a survey by Mr. M. H. Panhwar, the oceanic encroachments have destroyed the underground sweet water aquifers of Sindh up to 58 miles northwards. Thus, the process of desertification has already been initiated at the tail-end of Indus resulting in an overall destruction of the sweet water resources of Sindh which are already only 15 per cent as against 80 per cent of underground sweet water resources of Punjab.

The agriculture of Sindh took an organized shape when the largest irrigation system of the world, the Lloyd Barrage was constructed at Sukkur in 1932 AD. The Tarbela dam was constructed on Indus in 1976. Besides, five more barrages – Jinnah Barrage, Chashma Barrage, Taunsa Barrage, Guddu Barrage and Kotri barrage- were constructed for the purpose of diverting water to the agricultural fields in Punjab and Sindh. The Mangla Dam on a tributary of Indus in Punjab territory proved, perhaps, the last straw on the camel's back.

Previously, the Mangrove Forest of the Indus Delta, the fifth biggest of world, was spread in 600,000 hectares. Today, it is hardly 75,000 hectares in area. So, the mangroves are depleting with a faster speed. The Palo (Clupea Ilisha) fish sustaining the livelihood of the fisher folk of the Indus has become extinct. The major crop of Red Rice in the Indus Delta has become the chapter of the past and the fish production at the Sindh coast has de-

clined by more than 70 per cent.

It is very strange that the economically conscious authorities of Pakistan have very little realization of the drastic decline in fish export which is the biggest foreign trade for Pakistan fetching the highest earning of valuable foreign exchange for the country. The Pakistan establishment is sacrificing the high-earning foreign trade of fish for the sake of pleasing the Punjab. It can only be termed as a remedy of melancholy with madness.

However, the environmental disaster being generated in the Indus Delta at the tail-end of river Indus has a faster speed while the prospects for the resolution of Sindh-Punjab water dispute is very slow. A decade has passed away since the signing of the 1991 Water Accord, but so far no any study has ever been conducted on the requirement of water flow to the sea downstream Kotri Barrage.

Meanwhile, the human habitat is being vanished away in the tail-end of Indus and the populace of Delta is migrating to Thatta and Karachi after the sources of their livelihood are being destroyed once and for all as the garden areas are being converted into marshes in the Indus Delta.

In times immemorial, a mighty river broadly parallel to that of the river Sindhu used to flow from high mountains of the Himalayas to the Arabian Sea. It was called Sarasvati. Its delta was spread over 300 km facing Kutch, which then was an island.

Sarasvati and Sindhu rivers were major lifelines of people. Sindhu and Sarasvati helped to flourish one of the greatest civilisation of the world - the Sindhu-Sarasvati

Civilisation. At that time inhabitants of this region were prosperous and rich. They established great cities, traded with far away countries. The death of Sindhu's sister Sarasvati resulted into the demise of Sindhu-Sarasvati civilisation. Ironically, this historical catastrophe has never been kept in mind ere. The people here have never studied devastating affects of water diversion and thus harm the rivers by diverting more and more water. On the contrary, the civilized world is going back to free-flowing rivers through decommissioning process while Punjab and WAPDA, the main protagonists of dams in Pakistan, still see the dreams of prosperity in dams on the rivers. In the enlightened world most of the dams were dismantled because they were proving Frankenstein. In most of the cases, the dams were brought down to save endangered species, while here in Pakistan the dams are proving ominous for the ivers themselves. The scientists are planning around the world that the dams should not be permanent structures on the landscape. The USA government has been convinced to remove all of its dams from its rivers to keep them healthy.

The indigenous fishermen having lifelong experience of sea behavior, speaking at a seminar on Indus Delta organized by the Pakistan Fisherfolk Forum (PFF) at Keti Bandar town of Thatta district in February 2002 revealed that with complete stoppage of river water to the sea, the ocean has started eroding and encroaching upon Sindh coast and the Indus Delta including its creeks such as Manora, Gizri, Korangi and Phitti, within which is located the city of Karachi.

They cautioned the people of Karachi to be aware

of the advancing sea which has already damaged the mouth of Manora creek accommodating the port of Karachi. "The people of Karachi must know that they inhabit the deltaic region of Sindh created through process of sedimentation by the river Indus. So, if deposition of silt through flow of river is subsided drastically, the reverse process could endanger Karachi."

It is pertinent to mention here that about 50,000 years ago, the Indus Delta started from Kalabagh located in today's Mianwali district of Punjab. It was due to the centuries-old flow of the silt-rich water of Indus that the sea went on receding to the point where it is at Karachi today.

On that occasion, Mr. Mohammad Ali Shah, Chairman PFF, addressing the seminar had said "Although I am not an expert on the subject, but I can say with authenticity that if flow of the fresh sweet water of Indus stops to the sea once and for all, both ports of Karachi can be damaged by the sea erosion posing serious threat to the city of Karachi. I therefore call upon the people of Karachi to join the campaign launched by Karachi's fisher folk to save Indus and the people inhabiting the deltaic region of Sindh including Karachi.

"There were thick jungles of Mangroves, great herds of buffaloes, cows and camels, bumper crops of Red Rice, an ever-increasing fish-catch of Palo, shrimp and other fishes in abundance. Today, the Palo fish has become extinct, the Red Rice are no more, the Mangroves are depleting while the human settlement of Keti Bandar faces the danger of being washed away by the sea.

"In 1980, the fish-catch of Palo from the Indus

Delta was 1,850 metric tons which was reduced to mere 265 metric tons in 1995. The main cause was a drastic decrease in flow of river water into the sea. The National Drainage Program (NDP) of the federal government was intended to destroy the Indus Delta. It has been decided by now to drain out all RBOD waste into Indus Delta through Gharo Creek.

It was disclosed at the seminar that:

** As result of oceanic encroachments, the 'Sookhi' town of Kharo Chhan had just disappeared from the scene.

** The road from Keti Bunder to Karachi via Juho and Hambbas is now under sea water. The fishing boats are plying here today.

** Many small islands have disappeared under encroaching tides of the sea water. The camel-breeders are quarrelling with each other where to breed the camels.

** Previously, the water of the sea used to enter into Indus Delta through creeks. Now, the creeks have ceased to exist as the oceanic tides have filled their mouths with gravel and now the delta area as a whole comes under water from the above.

** Most of the villages in the Delta have earthen embankments around for the fear of approaching sea.

** The Port Qasim authorities installed a small Light House on the bank of the Phitti Creek. Today, it is standing in the middle of the sea water. Then, they erected another Light House on a spacious ground on the bank of the creek, but that too was run over by the advancing tides of the sea. So, today, it is the third Light House which serves the purpose.

** The wall constructed to block the flow of sea water approaching Gizri, has been shattered by gushing tides of the sea.

** The sea water, first time, has touched the last bridge on Indus at Sujawal. The silt-rich sweet water has given way to the black and bitter sea water in the main channel of the Sindhu Darya.

** According to the villagers, in early seventies, the Union Council Gharho was located 15 kilometers far from the sea. Today it is hardly 5 kilometers away from the high sea.

(Written for a publication of the Peoples Doctors' Forum: September 2002).

SOS FOR INDUS DELTA

Our commercial pursuits have destroyed the very ecology of the legendary River Indus. We preferred agriculture than ecology. This has resulted in an environmental disaster in the tail end of the river called Indus Delta, where human habitat is being vanished away, the populace is migrating and the very survival of the legendary river Indus is at stake.

The upper riparian started developing agriculture as far back in 1830 AD. The agriculture of Sindh took an organized shape when the largest irrigation system of the world, the Lloyd Barrage was constructed at Sukkur in 1932 AD. Prior to 1830 AD, the flow of Indus water downstream Kotri barrage to the sea was 150 MAF. By then, the Indus Delta country, as the western authors paraphrase, was like a garden.

Today, such a quantum of water is not available even in the whole Indus River System. It is either 114 or 104 MAF. And it has become the bone of contention between Sindh and Punjab during current inter-provincial water crisis. The official figure of water discharges down-

stream Kotri Barrage in 2000 was zero (0.27 MAF.)

So, during present water shortages of acute nature being experienced by the river Indus and the consequent endeavors of both the Punjab and Sindh to get as much irrigational supplies as possible for their agriculture or so to say the prosperity of their landlord class of people, the tail-end of Indus, the greatest Himalayan river of the sub-continent, has completely dried up.

With complete stoppage of the fresh water flow of Indus to the sea, the ocean has started hitting back at the Sindh coast. The oceanic encroachments have initiated the process of desertification in the fertile valley destroying the destroying the sweet water aquifers of Sindh besides the habitat of flora and fauna of Indus Delta. Due to oceanic encroachments, more than 2.2 million acres of fertile agricultural lands have been destroyed in Thatto and badin districts.

Prior to the 1830 AD, the Indus used to fetch 400 million cubic meters of silt in the Indus Delta thereby enhancing its territory by 20,000 acres per annum. Today, 10 MAF of water envisaged in the 1991 Water Accord is not being implemented whereas according to the expert opinion of ICUN at least 35 MAF of water must flow into Indus Delta for its rehabilitation, and to sea for preservation of ecology of river's tail-end. It is not a small place; Indus Delta is spread in 5,000 sq miles with 200 miles mouth with the sea.

Previously, the fifth largest Mangrove Forest of the Indus Delta was spread in 600,000 hectares. Today, it is hardly 75,000 hectares in area. So, the mangroves are depleting with a faster speed. The Palo (Clupea Ilisha) fish

sustaining the livelihood of the fisher folk of the Indus has become extinct. The major crop of Red Rice in the Indus Delta has become the chapter of the past and the fish production at the Sindh coast has declined by more than 70 per cent. This is more so due to the construction of one major dam and half a dozen barrages on the Indus.

T24he environmental disaster being generated in the Indus Delta at the tail-end of river Indus has a faster speed while the prospects for the resolution of Sindh-Punjab water dispute is very slow.

A decade has passed away since the signing of the 1991 Water Accord, but so far no any study has ever been conducted on the requirement of water flow in the downstream Kotri barrage. Meanwhile, the human habitat is being vanished away in the tail-end of river Indus and the populace of Indus Delta is just migrating to Thatta and Karachi after sources of their livelihood are being grossly damaged as the gardens areas of Sindh are being converted into marshes in the Indus Delta.

BIGGEST FESTIVAL OF SINDHU'S DELTA

A panoramic island spread over about five kilometers is surrounded by thousands of fishing boats hoisting multicoloured flags and buntings.

In the centre of the island is a small shrine which is visited by the fisherfolk inhabiting the coastal areas of Sindh, Balochistan and India.

The pilgrims are mostly women who come to pay homage at the saint's shrine while dancing, singing and praying in ecstasy. The camels bred on the mangroves of the Sindhu's Delta also come to dance on this occasion.

This is the Melo of Haji Ibrahim of Wa'ari (a creek), the biggest fisherfolk festival observed every year in spring. The nine-day festival begins as per the lunar calendar from the first moon of the month of Zil Qa'ad to its ninth. This year the Melo of Haji Ibrahim of Wa'ari was observed from February 7 to 15.

Located in a creek of the Sindhu Darya known as "Wa'ari" adjacent to the Sir Creek on the Sindh-Hind border, the mazar of Haji Ibrahim of Wa'ari in Shah Bandar Talluka of Thatta district attracts fishing communities

right from Gwadar, Pasni and Jiwani to Baba Bhit, Ibrahim Hyderi and Rerhi Mian as well as from Kutchh, Gujarat and Bombay.

Politics, however, has greatly polluted the culture of the subcontinent so much so that the pilgrims from Hind to Sindhu's Delta have not been seen in the recent past as a result of perennial tension along the post-colonial border. We should remember that Gujrat, Rajistan, Punjab, Haryana, Himachel Pardesh and Kashmir are all an integral part of our Sindhu civilization.

In present times of mounting tension along the now-recognised eastern borders, even local pilgrims experienced some hardships in getting to the shrine of Haji Ibrahim of Wa'ari.

According to the press reports, the naval authorities stopped caravans of people going to attend the Melo. Later, they asked the pilgrims to deposit their NICs at the checkposts and collect them on their return.

However, when the masses started pouring in, they quietly withdrew the standing orders.

Khalifo Ali Mohammad, manager of the Melo told local reporters the people were scared of coming over because of the military takeover in the country. According to him, unfortunately, hardly one-fourth could attend the Melo in their ancestral homeland. However, despite everything the Melo was a spectacular affair as the people kept on coming and going along with their fishing boats. The universality of culture was all-pervasive !

It takes about 12 hours from Karachi, 8 hours from Keti Bandar, 7 hours from Jangisar, 6 hours from Kharo Chha'an and 3 hours from Shah Bandar to reach the Melo

in Wa'ari creek. The fisherfolk come over here with great reverence and take off their shoes after landing on the island.

As a ritual they always take some sweet water with them to present as ' Nazrana ' at the shrine.

This Melo is unique in Sindh for many reasons. As the Christians decorate their houses for Christmas, the fishermen and women of the coastal areas colour their fishing boats anew in celebration. Secondly, the fisherfolk consider it as their religious duty to take any stranger intending to attend the Melo of Wa'ari in their fishing boat free of cost along with their ladies and children. Thus a stranger going to attend the Melo will get free lodging, boarding and transport by the local fishermen.

Malakhro, wrestling Sindhi-style happens to be a great event at this Melo. Youth excercise their muscle power and bodily strength in Malakhro and get rewarded in cash and kind. The camel races and their exhibition for sale happens to be the chief activity of this event.

The breeding and sale of 'Sa'akrai' (of Mirpur Sakro) camels greatly add to the income of local Jats in Sindhu's Delta. The handicrafts produced by the womenfolk of this area are fascination on their own.

Most of the pilgrims construct their straw huts on the island and settle down there for all nine days of the Melo. They believe that the festival of Wa'ari was a ritual not only for the fishermen and women but also for their fishing boats. And, since this year's Melo is the first after the devastating cyclone of last May, so many credulous persons deemed it fit to go and pray at the shrine of Haji Ibrahim of Wa'ari for a safe voyage on the high seas.

OCEANIC ENCROACHMENT ON SINDH COAST THE SEA HITS BACK

With flow of the Indus river diminished on large scale during last five decades due to construction of five barrages and one dam on it, some drastic ecological and environmental changes have taken place at the tail-end of the river posing threat to the very survival of the river.

Besides the region of Indus Delta spread over 5000 sq. kilometers accommodating seventh largest Mangrove forest of the world and human population to the tune of about one million souls has been affected adversely along with their wealth of fish and the red rice etc.

At the time of partition of the subcontinent, the downstream flow of water at Kotri barrage was 150 MAF. The Water Accord signed by the Sindh government with the federation in 1991, provided for at least 10 MAF of water to flow under Kotri barrage - the last irrigation system constructed on Indus river in 1958. But for all practical purposes, not more than 3 MAF of water flowed

downstream Kotri barrage in the early nineties.

Even then there is hue and cry over the so called wastage of water flowing downstream Kotri barrage to the sea. Those who consider water flowing downstream Kotri barrage as wastage overlook the Indus Delta, the tail-end of the river.

And it is the requirement of the International law on the water streams that if any water stream does not reach its tail end , it would be considered as 'dead'.

So, with flow of Indus subsided drastically due to construction of the barrages and the dams on it, an acute scarcity of water is has taken place in the tail end of the river. It is considered by Sindh experts as the slow poisoning of the river, the beginning of the very end of the very river Indus.

WHAT LIES DOWNSTREAM KOTRI BARRAGE?

The answer is . . . the sea !

Based upon such a preposition it is maintained by the highly knowledgable Sindh government bureaucrats working for the Irrigation Department especially, as well as, by the intellectuals of our northern neighbour, that the water which flows downstream Kotri Barrage is a sheer waste as it flows into the sea.

So, even if it is true that there is nothing else but the sea downstream Kotri Barrage, the government experts as well as our ruling intellectuals must not forget that when a river makes its confluence with the sea, there must be some natural wisdom behind such a historical process !

But, as a matter of fact, they have no time to think deep over such an unimportant matter of meagre significance. Or perhaps it is because they are 'Geography Blind', and wearing 'the tinted glasses of bias' that they are unable to see the Delta region of Sindhu Darya which

European scholars identify as " the Indus Delta country".

Anyway, whatever it is, we would definitely keep on praying to the Almighty that He may give insight to the Sindh Government experts as well as our great intellectuals of the north to see beyond their nose and try to locate a very small place known as Delta of Sindhu Darya in the tail-end of the lifeline of Pakistan.

Meanwhile it is submitted with due respects that between Kotri Barrage and the sea lie two vast regions comprising of highly fertile agricultural estates of Dadu and Thatta districts of Sindh besides what the Western scholars name as Indus Delta.

The region of Sindhu's Delta is spread over 6,00000 hectares or so to say 5000 square kilometres with 200 kilometres of its mouth with the sea.It is inhabited by millions of human souls and livestock population. The seventh biggest Mangrove forest of the world is located here. It feeds the shrimp and the camel besides strengthening the Sindh coast which in fact is the Pakistan coast.

The exportable commodity of shrimp along with other species of fish has been enriching national exchequer of Pakistan while the breeding of camel has been a centuries-old phenomenon in Sindhu's Delta. The European travellers who set their foot on the soil of Sindh in the early years of the seventeenth century A.D. had observed such a spectacle of a boat bringing sweet water from far off places for the camels to drink. The camels of Sindhu's Delta are exported to the Middle-Eastern countries and earn valuable foreign exchange for Pakistan.

So, besides the human beings and livestock, the Mangroves and fish, the camels and Red Sindhi cows, the

region of Sindhu's Delta used to produce Red Rice which used to be exported abroad in exchange of the pearls, jewels and gold at the time when Sindhu was a mighty river. The production of Palo fish which used to be the main source of livelihood for the fisherfolk of Pakistan's southern most province has been drastically curtailed in the present times more so because of the subsided flow of water in the Delta region after construction of the barrages and dams on Sindhu Darya.

The Delta area of Sindhu has been expanding with every high flood by atleast 20,000 hectares as a result of the process of siltation. Thus it used to add to an ever-increasing territory of Pakistan. But since the flow of water downstream Kotri Barrage has been considered as sheer waste in the present times, the oceanic encroachments are eroding the coast thereby diminishing the territory of Pakistan.

The Sindhu Darya used to bring 400 million metric tonnes of silt to this region at the time when about 150 MAF of water used to flow downstream Kotri Barrage in the pre-partition period. Today the quantum of silt has been reduced to less than 100 million metric tonnes and the process of desertification has already started at the tail-end. The upstream push of the sea caused by the subsided flow of Sindhu's water in this region has destroyed the underground sweet water reserves up till Thatta and this disasterous process of environmental degradation is approaching Hyderabad
in the north.

This is all because of an incorrect answer to a question of common sense, " What lies downstream Kotri Barrage" ?

PORT CITY DECLINES TO BE A TINY FISHING VILLAGE

(2.2 million acres of fertile land destroyed in Indus Delta)

The port city of Ketibandar whose municipality had provided financial aid to the Karachi Municipality once upon a time has, now, declined to become a tiny fishing village more so because of the diminishing supply of fresh sweet river water in the Indus Delta.

This process started late in the 1800s when agriculture in the upper riparian region of Punjab started developing and for that purpose the waters of Indus were diverted upstream for irrigation purposes.

With the course of time, in all six barrages (Jinnah, Chashma, Taunsa, Guddu, Sukkur and Kotri) and two dams (Tarbela and Mangla) were built upstream within periphery of the Indus river system reducing water flow to the deltaic region of the river in its tail-end.

The history of Indus river system bears witness water quantity to the tune of 150 MAF used to flow into

the sea prior to 1830. Today, such a quantum of water does not exist in the whole system. It is, at present, either 104 MAF or 114 MAF, according to the claim made by Punjab and Sindh respectively.

The secret of such a huge waterflow into the Indus Delta and the sea was the supplement of water brought down by Nai Gaaj, the biggest torrential river of subcontinent emanating from deep in Balochistan and terminating directly into Indus at Dadu.

The British government diverted the waters of Nai Gaaj into Manchhar Lake thereby irrigating thousands of acres of Kachho land in the way by constructing Tirath Bhitt (a wall reinforced by stone and lead).

The Ghulam Mohammad Barrage at Kotri constructed in 1955 proved to be the last straw on the camel's back. With it, the process of desertification started in the Indus Delta spread in an area of 5,000 square miles. This happened along a 200 kilometre mouth with the sea having 17 major creeks making confluence of the stretch from the Indus with the sea possible.

With drastic reduction in the flow of fresh sweet river water, the ecology of Indus Delta was ruined; the Red Rice crop vanished; the Palo fish (clupea ilisha) became scarce; the Mangrove gardens spread in 260,000 hectares were reduced to a mere 70,000 hectares; the production of shrimp declined by 70 percent and, 2.2 million acres of the most fertile agricultural lands became marshes in the tail-end of River Indus.

A clean-shaven old man, Ghulam Hussain Memon who is 85, and has served both as teacher and postman in the then port city of Ketibandar mourned the death of In-

dus Delta. Recalling the old days he said "our municipality had advanced a loan of Rs100,000 to the Karachi Municipality to support it financially. We used to export red rice and import pearls, gold and timber. The delicious Palo fish having a fragrance of its own was in abundance; palm trees, mangoes and banana yielded bumper crops; the sea was 15 kilometres away from Ketibandar and, hundreds of vessels remained anchored here always. Today, there are not more than 200 wooden huts surrounded by encroaching sea water in Kctibandar."

Faiz Mohammad Khokhar, 80, said that his ancestors had migrated from Punjab and settled down in Ketibandar. "I was born here. What you see today is the seawater all around. But, in our times, it was an area of fertile paddy-growing fields. The small channels of sweet water emanating from Indus used to flow here. The grain, fish, fruits and money were in abundance. Today, we live only on those lost memories."

An old fisherman named Ishaq Dablo who said he was born when the Khilafat Movement was on, standing on a tiny island in the vicinity of Ketibandar said "We purchase 60 litres of drinking water for Rs25 for which we use kerosene oil or diesel worth Rs150 to sail to the shore. With stoppage of sweet river water, our buffaloes, milk, butter and ghee has also vanished. Now we burn oil worth Rs500 and bring a fish-catch worth Rs600."

Chairman of Pakistan Fisherfolk Forum (PFF) Mohammad Ali Shah said that in 1976, there were 100 to 150 houses in Goth Ali Hasan Dablo. "There was a thick jungle around which served as grazing ground for cattle. Milk, butter and ghce was in abundance. This whole area

was surrounded by mangrove trees. There was fish in the waters.

"According to a Chinese saying 'where there are trees, there is fish in the waters.' Now, the mangrove trees are no more and, so there is no fish. Most of the people in and around Ketibandar have migrated to Thatta and Karachi while those still living here are preparing to migrate. To make their stay possible here, the government must provide drinking water to them. And, for the complete rehabilitation of Indus Delta, the federal government must release at least 35 MAF of water to flow downstream Kotri Barrage."

RBOD POLLUTES SINDH'S SWEET WATER RESOURCES

Karachi: Long before commissioning of the Right Bank Outfall Drain (RBOD), three major sweet water resources of Sindh on the right bank of Indus have been polluted and poisoned by the toxic waste coming from western Punjab, Balochistan and northern Sindh as a result disasterous environmental degradation is causing heavy damage to the fertile agricultural lands besides human as well as livestock health.

The first such sweet water source of Sindh standing polluted today by the RBOD is the Western Nara which happened to be a natural inundation canal of Indus on the right bank for filling the Hamal lake in the west of Larkana and the Manchhar lake in the west of Dadu district with sweet water in case there were no rains. But today it has been converted into a drain (RBOD) flowing with huge quantities of agricultural effluents, hazardous chemicals, pesticides, insecticides and DDT, toilet and industrial waste etc. So, the WAPDA authorities have

converted the sweet water canal into a drain -- the MNVD (Main Nara Valley Drain) and thus poisoned its waters once and for all.

The second major sweet water source of Sindh polluted by the RBOD is the Hamal lake. It is the second biggest natural sweet-water lake after Asia's biggest Manchhar lake with thirty miles length and twenty miles breadth. It is bigger than the Keenjhar and other twenty-seven lakes of Sindh.

Today its sweet water has become saline after discharge of toxic sewerage from Dera Ghazi Khan and Muzafargarh besides a number of urban localities of Balochistan and northern cities of Sindh. The MNVD today brings waste water from four or five drainage projects in Dera Ghazi Khan and Muzaffargarh and discharges it directly into Hamal lake.

The third sweet-water source of Sindh seriously affected by the RBOD is the Manchhar lake which is inhabited by 1.1 million souls (as per 1981 census) and spread in more than 200 square miles. It happens to be the biggest sweet water natural lake of Asia.

This great sweet water lake today contains 9.5 feet deep poisonous water with 4000 PPM saline rate. (The potable water must not exceed 1000 PPM.) As a result, a number of sweet water fishes have vanished and become extinct in the lake. What remains back in the highly contaminated waters are the fishes which have less value in the market. So, the earnings of the Manchhar's fishing folk have been decreased drastically after the sweet water of the lake has been spoiled by the drainage scheme.

The hazardous effects of the impure water

in Manchhar lake were witnessed by this scribe during a long drive on the Manchhar Containment Bund (MCB) and Jhangara - Bajara road where people living in small hamlets around the lake were seen drawing water from shallow wells which gave slightly filtered water for drinking purposes. The villagers told this scribe that the water was sour in taste having an unpleasant odour and was not extinguishing the thirst. They said, " Even the domestic animals were not ready to drink this dirty water of Manchhar. It is therefore that we humans and our animals drink togrther from these shallow wells." And the result was the complains about GIT disorder and skin allergies in humans besides some othe diseases in their livestock.

Protesting against supply of such poisonous water to Sehwan city, the followers of Shehri Ittehad took out procession, raised slogans against the district administration and blocked the roads till SDM of the area came to stop the flow of water from Manchhar lake into nearby river Indus through Aral Wah. This canal brings surplus water of Manchhar to river Indus in case there are heavy rains and inadequate floods. The demonstrators also organised a sit-in at the very outlet of Aral opening to Indus from where drinking water is supplied to the people of Sehwan.

As a amatter of fact the local authorities had decided to drain out poisonous water from Manchhar on persistent demand of the fisherfolk of the lake to empty the lake of its poisonos waste prior to the forthcoming monsoon so that it could be filled with fresh water by the rains. But since the water was poisonous, the inhabitants of Sehwan city did not allow its drainage into Indus from

where they are taking water for drnking purposes. The fisherfolk living in the bed of the Manchhar lake have by now started buying one jerry-cane of 20 litre sweet water from nearby town of Bha'an Saeedabad at Rs. 10. "Never before in our life had we purchased water with money", cried a fisherman with wrinkles of pain visible on his forehead.

Their agony could be easily understood as the inhabitants of a sweet water lake had no water even to drink. It reminded of a famous verse composed by Shah Abdul Latif Bhitai , saying, " Having huts on the water bank, the foolish are dying of thirst." Shah Latif is right. It is indeed our folishness that we have mismanaged our water resources in such a way that the people inhabiting the green belt of the Indus valley are inflicted by perennial pathos of water scarcity.

The Manchhar has not been filled to its capacity during last one decade as a result drought conditions prevail there since then. And now when its sweet water has been contaminated by the RBOD scheme, the process of desertification has started within boundaries of the lake.

So, a project (RBOD) aimed at making Sindh green has started converting at least half of it (the whole of the right bank of Indus) into desert by converting its sweet water into saline, sour and poisonous waste. Now since the poisonous water has been spread into the under - currents of earth, the vast vicinity of the lake has become infested with brackish, undrinkable and non-potable water.

So far hardly 50 % of the RBOD work has been completed. The construction of the syphon and Sehwan

Barrage is yet to be initiated while a number of culverts, bridges and portions of the drain are also to be completed for throwing such contaminated water into Indus river flowing on the eastern edge of Sehwan city.

And it would be only then when the lifeline of Sindh - the legendary river Indus would be spoiled by the RBOD with undrinkable water which would naturally be supplied to the people of Indus Delta including city of Karachi.

INDUS DELTA RESEARCH STUDY

(Assignment of Pakistan Fisher Folk Forum)

CONTENTS

ABSTRACT

METHODOLOGY

1: WHAT IS A DISASTER?

2. INDUS-AN OVER VIEW

3. DISASTER PRONE AREAS OF INDUS DELTA

4. CHRONOLOGY OF NATURAL DISASTER IN INDUS DELTA

5. CHRONOLOGY OF MAN-MADE DISASTERS IN INDUS DELTA

6. DISASTER VULNERABILITY OF INDUS DELTA

7. IMPACT ON INDUS DELTA

8. CONCLUSIONS, PROPOSALS, RECOMMENDATIONS

ABSTRACT

The remedy to all ailments of Indus Delta is WATER and WATER only. This is the conclusion of this study if described in a single word. An abundant flow of sweet and fresh river water in the downstream of Kotri Barrage to the tail end of the river and the sea is the pre-requisite and basic requirement for complete rehabilitation of Indus Delta eco-region of Sindh.

It will reduce the disaster vulnerability of the Indus Delta; help people regain strength to cope with disasters; set the ecological equilibrium of delta right; deter frequent occurrence of different disasters besides bringing about socio-economic development among the inhabitants of the tail enders. It could definitely increase the resistance power of the people inhabiting this area to cope up with disasters, both natural as well as man-made.

The Indus Delta Eco-Region by virtue of its geographical location and climatic character is highly prone to various forms of natural and man-made disasters. The line of seismic activity passes from its doorsteps, and while emanating from Mekran Coast (Balochistan) on one

side, and Rynn of Kutchh (adjoining India) on the other, it affects Indus Delta essentially. Right from 326 B.C., when naval fleet of Alexander the great was destroyed by a tsunami on Mekran Coast, and up to the 2001 (January 26) earthquake, innumerable jolts have taken heavy toll of human lives, economic damage and environmental destruction in the region adjoining Arabian Sea.

The Cyclones frequently visit this part of southern Pakistan. The 02A Cyclone of 1999 was so devastating that the people have not as yet recovered from its shock besides its adverse economic effects. It was after six long years that the people of disaster prone districts of Thatta and Badin could find some flow of sweet water during monsoon of 2005 after persistent drought and destruction in the aftermath of 1999 Cyclone.

The rain floods in 2003 played havoc with the low-lying deltaic plains of Badin and Thatta, where basic infrastructure was disrupted completely, and people became victim of hunger, disease and death. The devastating rains of 2003 came after long dry spell of seven years. The last rains in Sindh fell in 1995-6, when the protective wall of Nai Gaaj known as Tirath Bhitt was washed away by the gushing waters of Gaaj, which is the biggest torrential river of Sindh's mountains.)

A folk saying in vernacular Sindhi came true that 'the tail end is either dried up or inundated'. Thus the seven-year long calamity of drought was followed by rain-floods during the monsoon of 2003.

And now it was the turn of man-made disasters. The flow of fresh river water in the downstream .of Kotri Barrage diminished drastically during past two decades. The universal phenomenon of global warming was supplemented

by dearth of water created by construction of dams and barrages in the upstream of Indus River. The diversion of river water for agricultural development in the north diminished irrigational supplies to the south, so much so that according to official figures of Sindh Government, 0.78 MAF of water flowed in the downstream of Kotri Barrage in the year 2000, and afterwards. **(1)**
It was besides the fact that a gross damage had already taken place in the Indus Delta Eco-Region, where the livelihood of 2.7 million people was at stake; more than 70% of fish catch was reduced in the deltaic region; the 660,000 hectares of mangroves depleted to mere 73,000 hectares; 2.2 million acres of the most fertile agricultural lands in southern Sindh were spoiled by sea intrusion; and the mass migration of the people began from the tail end of river. Even then it was said that water discharges in the downstream of Kotri Barrage was a sheer waste. **(2)**

The poor fisher-folk have no means to cope up with disasters; the rulers lack will to act; the feudal element behave as a parasite to suck the left out blood from the veins of the poor. So, in such a hostile environment, some civil society organizations such as Pakistan Fisherfolk Forum (PFF) came to the rescue of the poor fishing communities through advocacy campaign and direct action. But, for lasting remedy of sustainable development, a comprehensive master plan must be devised by the international development agencies with collaboration of Pakistan Government and Non-Governmental Organizations (NGOs) operating in the country to cope up with situation arising out of disastrous effects of natural as well as manmade calamities hitting Indùs Delta Eco-Region frequently. It is a must to save the greatest Himalayan River Indus feeding millions of human populace in South Asia.

METHODOLOGY

As the key task and basic responsibility of the researcher, I have collected, organized, co-related and analyzed textual and statistical data from the primary and secondary data sources to present holistic overview of disaster vulnerability of the Indus Delta Eco-Region and the coastal communities the fisher-folk in particular. The study includes a brief historical overview on disasters in the two districts of Thatta and Badin; an identification of specific needs of the area for long-term support; the community-based risk reduction, mitigation, and preparedness against disasters, and for sustainable livelihoods.

For it, I had to visit Thatto and Badin districts in particular and on Sindh province in general. The research from the secondary data sources provided information on an overview of disasters in the two disaster prone districts and their vulnerable southern Union Councils. The floods by Indus in spate pose as a disaster in whole of Sindh during monsoon.

The Left Bank Outfall Drainage (LBOD) and its

role in increasing the vulnerabilities of the local communities during flood situation damaging key livelihood sources such as agriculture, livestock, fishing, etc. Besides, some other opportunities were analyzed for livelihood of the local communities pertaining to sugarcane cultivation, employment of local people in oil and gas fields, etc in Badin area, and chances of private trade and business etc.

This scribe randomly selected three villages from each district for primary information collection, and it was ensured that the villages from agriculture areas, coastal areas and rain-fed areas were included in the sample. As key informants, it was ensured that the informants (men and women) were those directly affected by the disasters besides the stakeholders.

In Badin District, the selected model villages were Bhugra Memon, a rain-fed, agricultural and trading village; Goth Ismail Thaheemani, a settlement near Badin oilfield and a fishing village; and Goth Khamoon Malah, a rain-fed as well as village of Indus Delta.

In Thatta District, the three selected model villages were Jaati, where maximum human loss occurred during 1999 cyclone; Village Ishaq Dablo (an islander settlement) near Keti Bandar and Keti Bandar itself.

The traditional leaders, professionals, local NGOs, and others provided Information and knowledge of area other than that of the Government. Traders and transporters at market centers shared information on food supply and demand, price hike and black-marketing in times of disasters, drought and floods etc. Other individuals as necessary among different livelihood groups, genders, and

ethnic/social groups of various categories were also interviewed. Thus a combination of research techniques from PRA tool basket was used to bring about structured observations, semi-structure dialogue as well as transect walk as crosscutting research technique.

The Participatory Research methods usually used by the development institutions was applied including review of secondary source, documents, statistics, reports, books, files, aerial photos, maps, direct observation, semi-structured interviews of key individuals, focus groups, homogeneous or mixed groups, chain of interviews, and probing questions were floated inviting creative output.

1. WHAT IS A DISASTER?

A disaster is great or sudden misfortune; an unexpected accident resulting from natural or man-made factors, or a combination of both, leaving behind a negative impact on the living conditions of humans, flora, fauna and other manifestations of biodiversity on earth. (3)

1.1 NATURAL DISASTERS:

There are different types of disasters. Natural disasters include floods, droughts, famines, earthquakes, cyclones, hurricanes, tornadoes, typhoons, landslides, volcanic eruptions etc. The world observed Global Meteorological Day on March 23, 2006 with a theme of 'Prevention and Mitigating Disasters. On this occasion, it was observed that economic impact of natural disasters had shown a marked upward trend over the last several decades. Additionally, developing countries, especially the least developed countries were more affected by the natural hazards. Four

phases were recommended by the World Meteorological Organization (WMO) regarding prevention and mitigation of natural disasters; the preparedness phase, dealing with awareness about natural hazards; mitigation phase, dealing with long-term planning for the community; response phase, about how the community 'weathered' the weather hazards; and recovery phase, regarding cleaning up, re-building and getting ready for the next one. (4)

1.1.1 MAN-MADE DISASTERS:

And the man-made disasters include chemical accidents, oil spills, radiological accidents, conflicts/wars, mass population displacement or refugee emigration, forest fires, water cuts, diversions and mismanagement of rivers through construction of dams, barrages, link-canals, and oceanic pollution etc.

One of the key reasons of disaster occurring in the world is a growing vulnerability due to demographic and land use changes. Increasing population, particularly in developing countries, places a greater burden on resources needed to sustain this population. Unplanned urban growth, expansion of urban areas and massive over-loading of city systems has led to cumulative problems. This is particularly true when we take into account the life styles and consumption patterns that we are currently see-ing in cities. For example, need for food and timber for building has increased erosion of topsoil due to deforesta-tion, draining of wetlands. This has eroded the natural de-fenses against disasters such as flooding and desertifica-tion.

The enfeeblement of natural defenses against natural disasters in the tail end of Indus River has specific reasons. What is called 'the botanic barrier' – the Mangroves, which obstruct the onslaught of any tsunami effectively is depleting in Sindh due to diminished flow of Indus waters in its tail end.

We need to recognize the fact that natural disasters are increasing in both frequency and intensity. Their impact on human lives and livelihoods, and the economy as a whole, is also increasing, due to higher population numbers and densities. Simultaneously, disasters caused as a result of human activities are also increasing, notwithstanding the awareness campaigns and strategic programming undertaken.

Secondly, capacity to combat disasters in developing countries is particularly weak, and disaster preparedness strategies and programs need to be built into ongoing developmental efforts, and link it to broader economic development. A number of stakeholders, at the global, national, sub-regional and local levels need to come together with different resources to deal with disaster mitigation.

One of the key aspects in disaster mitigation is to take into account all aspects of a disaster - and not just human relief and rehabilitation. Economic, social and environmental impacts need to be anticipated and appropriate measures taken. The entire disaster cycle of prevention, preparedness, assessment, mitigation and response should be part of any disaster mitigation plan, which must include the natural prerequisites for rehabilitation of Indus Delta Eco-Region pertaining to natural environment, ecological equilibrium and natural ecosystems.

1.2 DISASTER MANAGEMENT

The world is facing an increasing frequency and intensity of disasters - natural and man-made - that has had devastating impacts. As reported by the secretariat of the International Strategy for Disaster Reduction (ISDR), the last ten years have seen 478,100 people killed, more than 2.5 billion people affected and about US$ 690 billion in economic losses. Disasters triggered by hydro-meteorological hazards amounted for 97 percent of the total people affected by disasters, and 60 percent of the total economic losses.

The November 2004 typhoons in the Philippines claimed over 1,000 lives and devastated the livelihoods of many more. The recent Indian Ocean Tsunami was even more destructive: more than 150,000 lives were lost.

The greater tragedy is that many of the losses due to disasters could have been averted. Logging, both legal and illegal, contributed to the incidence of flooding and landslides; but this is only the most recent evidence of the importance of wise environmental management for disaster risk reduction.

Around the globe, land use and land cover changes are eroding the natural buffers that protect communities from hazard risk. These same changes often erode people's capacity to recover from disaster. Other environmental changes, such as anthropogenic global warming, promise to create new challenges to the security and sustainability of communities around the world. There are, however, opportunities to reduce disaster risk, and enhance community resilience.

The high volume of wastes from disasters, from households and debris from forests and rivers, also constitute a major concern for proper disposal. A study conducted by Japan's Ministry of Environment also showed that air pollution from urban and industrial sources has lead to increased acid rain by hurricanes and typhoons.

We have only now come to realize that taking care of our natural resources and managing them wisely not only assures that future generations will be able to live with sustainability, but also reduces the risks that natural and man-made hazards pose to people living today. Emphasizing and reinforcing the centrality of environmental concerns in disaster management has become a critical priority, requiring the sound management of natural resources as a tool to prevent disasters or lessen their impacts on people, their homes and livelihoods.

Meteorological and hydrological events, such as typhoons, are hazards that cause heavy rain, high wind and sea surges. But the real damage also happens due to the vulnerability of the people who lie in its path. Post-disaster assessment of hurricanes and typhoons have clearly illustrated that, along with disaster preparedness, proper management of the environment - its air, land, water, forests, and wastes, go a long way in reducing the risks and vulnerabilities associated with typhoons.

Environmental degradation combined with human activities are at the origin of numerous catastrophes such as flooding, desertification, fires, as well as technological disasters and transport accidents.

"Around the world, a growing share of the devastation triggered by 'natural' disasters stems from ecologically

destructive practices and from putting ourselves in harm's way. Many ecosystems have been frayed to the point where they are no longer able to withstand natural disturbances ... Although the inherent links between disaster reduction and environmental management are recognized, little research and policy work has been undertaken on the subject. The concept of using environmental tools for disaster reduction has not yet been widely applied by many practitioners." (ISDR).

There is a clear need to reinforce the importance of environmental concerns in the entire disaster management cycle of prevention, preparedness, assessment, mitigation and response and to integrate environmental concerns into planning for relief, rehabilitation, reconstruction and development. This will also require the enhancement of capacities to undertake short and medium-term activities in disaster management based on long-term environmental considerations.

Prevention of disaster and preparedness to confront it need to be the cornerstone of any emergency plan. Anticipating the level of damage with geographical information systems, simulation software, early warning etc., are also critical elements of a good disaster preparedness and mitigation plan. This has to be integrated with a post-disaster assessment, which can be used to draw lessons for preparedness and mitigation.

Initiatives dealing with disasters need to examine and assess to cover various laws and regulations, designed to mitigate and prepare for disasters. It should also demonstrate how well informed, grass-root organizations can successfully implement disaster management programs.

The disaster management must aim to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery. The Disaster management cycle illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Appropriate actions at all points in the cycle lead to greater preparedness, better warnings, reduced vulnerability or the prevention of disasters during the next iteration of the cycle.

The complete disaster management cycle includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure. The mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster. As a disaster occurs, disaster management actors, in particular humanitarian organizations, become involved in the immediate response and long-term recovery phases.

The four disaster management phases illustrated here do not always, or even generally, occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.

Mitigation - Minimizing the effects of disaster. Examples: building codes and zoning; vulnerability analy-

ses; public education.

Preparedness - Planning how to respond. Examples: preparedness plans; emergency exercises/ training; warning systems.

Response - Efforts to minimize the hazards created by a disaster.

Examples: search and rescue; emergency relief.

Recovery - Returning the community to normal. Examples: temporary housing; grants; medical care.

Developmental considerations contribute to all aspects of the disaster management cycle. One of the main goals of disaster management, and one of its strongest links with development, is the promotion of sustainable livelihoods and their protection and recovery during disasters and emergencies. Where this goal is achieved, people have a greater capacity to deal with disasters and their recovery is more rapid and long lasting. In a development oriented disaster management approach, the objectives are to reduce hazards, prevent disasters, and prepare for emergencies. Therefore, developmental considerations are strongly represented in the mitigation and preparedness phases of the disaster management cycle. Inappropriate development processes can lead to increased vulnerability to disasters and loss of preparedness for emergency situations.

1.2.1 Mitigation

Mitigation activities actually eliminate or reduce the probability of disaster occurrence, or reduce the effects of unavoidable disasters. Mitigation measures include building codes; vulnerability analyses updates; zoning and

land use management; building use regulations and safety codes; preventive health care; and public education.

Mitigation will depend on the incorporation of appropriate measures in national and regional development planning. Its effectiveness will also depend on the availability of information on hazards, emergency risks, and the countermeasures to be taken. The mitigation phase, and indeed the whole disaster management cycle, includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure.

1.2.2 Preparedness

The goal of emergency preparedness programs is to achieve a satisfactory level of readiness to respond to any emergency situation through programs that strengthen the technical and managerial capacity of governments, organizations, and communities. These measures can be described as logistical readiness to deal with disasters and can be enhanced by having response mechanisms and procedures, rehearsals, developing long-term and short-term strategies, public education and building early warning systems. Preparedness can also take the form of ensuring that strategic reserves of food, equipment, water, medicines and other essentials are maintained in cases of national or local catastrophes.

During the preparedness phase, governments, civil society organizations, and individuals develop plans to save lives, minimize disaster damage, and enhance disaster response operations. Preparedness measures include preparedness plans; emergency exercises/training; warn-

ing systems; emergency communications systems; evacuations plans and training; resource inventories; emergency personnel/contact lists; mutual aid agreements; and public information/education. As with mitigations efforts, preparedness actions depend on the incorporation of appropriate measures in national and regional development plans. In addition, their effectiveness depends on the availability of information on hazards, emergency risks and the countermeasures to be taken, and on the degree to which government agencies, non-governmental organizations and the general public are able to make use of this information.

1.2.3 Recovery/Rehabilitation

As the emergency is brought under control, the affected population is capable of undertaking a growing number of activities aimed at restoring their lives and the infrastructure that supports them. There is no distinct point at which immediate relief changes into recovery and then into long-term sustainable development. There will be many opportunities during the recovery period to enhance prevention and increase preparedness, thus reducing vulnerability. Ideally, there should be a smooth transition from recovery to on-going development.

Recovery activities continue until all systems return to normal or better. Recovery measures, both short and long term, include returning vital life-support systems to minimum operating standards; temporary housing; public information; health and safety education; reconstruction; counseling programs; and economic impact studies. Information resources and services include data collection

related to rebuilding, and documentation of lessons learned.

2. INDUS – an overview

The creation of the Indus River system most likely began some 50 m (fifty million) years ago when the Indian Plate, Gondwanaland, first collided with Eurasia, Angaraland. Between the two plates was the Tethys Sea, which was up-folded to form the great Himalayan Mountains in the Mesozoic era. These mountains, with their unbroken snow cover, became the primary source of water to the Indus system.

The legendary River Indus originates a few kilometers north of Lake Mansarovar in Tibet.

Today, five main rivers that join the Indus from the eastern side are Jhelum, Chenab, Ravi, Beas and Sutlej. Besides, two minor rivers - Soan and Harrow also drain into the Indus. On the western side, a number of small rivers join Indus, the biggest of which is River Kabul. The Indus River and its tributaries on an average bring about 154 MAF of water annually. This includes 144.9 MAF from the three Western rivers and 9.14 MAF from the eastern rivers. Most of this, about 104.7 MAF is diverted for agricultural irrigation.

In Indian mythology the four rivers originating from this area were described as rising out of certain animals' mouths. Therefore, qualities of the animals were attributed to the rivers.

As the myth goes, the *Pakshu* went westward in the beginning and then came out of a horse's mouth to the east to be called the Brahmaputra.

Sita went southwards in the beginning and then came out of a lion's mouth to the north to be called the river Sindhu.

The Ganga came out of an elephant's mouth and the Karnali from a peacock's mouth.

The waters of the Brahmaputra are cold and it is said that the one who drinks from it would become sturdy as a horse. The waters of the Indus are warm and it is said that the one, who drinks from it, would become strong like a lion.

Indus derives its name from Sanskrit word 'SINDHU', which means a large water body, a sea or an ocean. In Greek, it is called 'SINTHOS'; in Latin, it is called 'SINDUS'. In ancient Indian literature, Indus is regarded as 'SAPT SINDHU', which means leader of seven rivers – Five rivers of Punjab (Jhelum, Chenab, Ravi, Beas, Setlej); Kabul River and Sarswati (the lost river). The ancient Iranian empire of Achaemenians led by Darius the great – 1 pronounced 'SAPT SINDHU' as 'HAPT HINDU'. With it, the word 'Hindus' was invented.

The Indus originates in a spring called Singikahad near Mansarwar Lake. The spring is located in north of Himalayan range in Mount Kaillas, Tibet at an altitude of 18,000 feet above sea level. Traversing about 500 miles in a northwesterly direction, it is joined by the River Shyok near Skardu at an elevation of 9,000 feet. The river flows in the same direction for another 100 miles before it turns round Nanga Parbat and is joined by the River Gilgit at an elevation of 5,000 feet. The Indus then flows another 200 miles in a southwestern direction to eter into Pakistan ter-

ritory at Bagh-e-Darband; from there pouring into the plains at an elevation of about 800 feet at Kalabagh. From here, the river comes out of the mountainous gorges and spreads far and wide into the vast plains of the Punjab and Sindh.

This is the river that created a great civilization in the 3rd millennium B.C. The 4,500 years old great Indus Valley Civilisation was centered on its great cities, such as Mohenjo-Daro and Harappa, but many people lived in the country in small towns and villages. They made their living on the land; growing corn to trade in the cities and probably grew cotton for clothes. Mohenjo-Daro and Harappa were built on the flood plain of the river and because it flooded regularly, the people constructed massive mud-brick platforms to raise the buildings above the level of the floodwaters.

The area of the drainage basin of the Indus is 1018.5 km. sq [600,000 hectares] making it the 12th largest among the rivers of the world. Its deltaic area is 312 km. sq, ranking it 7th in the world. The annual water run-off is a little under 2022 m cubes per year - placing it 10th, and its annual sediment discharge is 2022 kg per year - ranking it 6th in the world. The Indus ranks at number 4 amongst the world's rivers in having a wave power at the delta shoreline of about 13 joules/sec/unit crest width and 1st in having a wave power at a distance from the shoreline at which the water depth reaches 10 meters of about 950 joules/sec/unit crest width.

2.1 INDUS DELTA

The Indus delta is a fan-shaped network of major and minor creeks, and occupies a large part of the province of Sindh, covering about 52800 sq. km from Karachi to the Rann of Kutch. The mouth of Indus with the sea is around 200 kilometers.

Historically, the Delta has been formed in an arid climate under conditions of high river discharge to the proportion of 4 billion tons of sediment per year. In past, this has contributed to a seaward prograding of the delta due to interaction of fluvial and marine processes and a moderate tide range of approximately 2.6 metres. Progradation has occurred in spite of extremely high wave energies of the 1,400 million ergs/secs.

Presently, there are 17 main distributaries of Indus towards sea. The past history has recorded 23 and 11 creeks in Indus Delta at different stages of mighty Indus. They further divide into second major distributories Turshan, Rajwari, Waatho, Khanand, Layari, Mal, Shukrano, Kado, Tiko, Ochto, Mirwah, Pakhyaro, Sanhri and Adhyari.

The riverine area [Katcha] downstream Kotri covers about 630,786 acres depending on the water flow down-

stream Kotri Barrage. The area, a flat plane along with the course of River Indus, 'extending on the either side in varying widths ranging from 5 to 160 km of a flood-prone area.' The area is rich and fertile due to nutritional silt depositions during river inundation periods. Forests, fisheries and agriculture are the important livelihood resources.

The forests provide timber, firewood, pit props for mines, forage and browse for livestock, biodiversity, and game animals, tannin from bark, gum, honey and even fish from Aha/ids and Ahoras [old river beds]. Shrubs / bushes are spread on an area of 88,092 up to the Indus Delta. These forests in the past have been very thick and extensive and have been supplying charcoal to the Middle East countries as well as some cities in India. It also fulfilled the need for timber, fuel wood etc. for the local population. Irrigated through the floods in the Indus River the area remained a great source of agriculture crops and orchards in the reverine area.

Several kinds of birds: heron, oystercatcher, lapwing, paddy bird, egret, reef, flamingo, Kite, eagle, vulture, plover, wihmbrel, curlew, godwit, sandpiper, greenshank, stint, dunlin, gull, tern, crane, kingfisher, meropidae, bea-eater, lark, wheather, hirundinidae, bunting and raven, mammals: dolphins, reptiles: beaked, annulated, yellow, short, and pelagic sea sneaks and fishes anchovies, engraulids, grey mullets, silve biddies, ponyfish, rays, skates, stone, scorpion fish, and gizzard shades, catfishes, carangis, sea pikes, barracudas, mugilids, hemrihamphids, percoids and clupeids are found in the Indus Delta area.

2.1.1 AREA, PEOPLE, LIFESTYLE

Squeezed to the narrower boundaries today, the delta spreads from eastern villages of Karachi, crossing coasts of Thatta to Sir creek in Badin near Sindh-Gujrat borders, with the population of 2.7 Million. That can be further specified in 128,720 inhabitants of Karachi coast, 1,113,194 in Thatta and 1,136,044 inhabitants in Badin districts. The six coastal talukas [Sub-districts] of Thatta form the immediate geographical and administrative sphere of the active delta with a population of 580,232 that covers 52.12% of the district population. Thatta has a low density of 64.1 people per sq. km. unlike Badin, which has 168.9 people per sq. km. The deltaic population of Karachi coast lives in about 100 small villages and helmets developed either at the creeks and waterways or at isolated islands, with semi-urban living style engaged in fishing, shop keeping and petty trading. The population in about 1000 deltaic / coastal area villages and settlements in the Badin and Thatta is dependent of agriculture, live-stock and fishing, however after seawater intrusion the agriculture related population has either adopted fishing as a profession or migrated to the urban ghettos of the south Sindh. This has badly affected the fish resources of the area. Due to sudden population pressure on the resources, the fish resources are badly affected.

The topography and geographical of the delta determines the lifestyle, social relation and economic modes of the delta area. Generally, they can be divided into four categories: The Island communities, The Coastal Communities, The Agrarian Communities and the Inland Communities.

Islanders are pure fisher folks, isolated from the mainland, mostly remain out for the fish catch trip and observe lower scale change in the cultural values and life style due to geographical barriers of communication with urbanised areas. They live in wooden huts and usually have a community-siting hut in the village, mostly hosted by the elder or the older. Generally, two or more islands form one village mostly based on same tribe. An island chief is not necessarily having an economic upper hand. Practically, it is a virtual status awarded in a common understanding to the veteran knowing much about the folk wisdom and vistas or the ups and downs of sea, which is both friend and foe to them. Woman of an island is more isolated than that of other geographical areas in the delta, greatly due to communication barriers.

The coastal communities comprise fishermen with some subsistence farming, especially animal husbandry like camels, cows, and goats. They are fast in adopting township culture and have mix trends of islanders, agrarians, and inland communities in their life style and cultural values, due to vast interaction and communication with all of them in the everyday life. Fishing is the major, while shop keeping, herding, and micro trading is the profession of a small number of population. They are towards urbanisation, however, due to gradual destruction of delta ecology and livelihood resources this progress is slow paced.

Settled on inland near the coast, the agrarian communities comprise mainly on sharecroppers, animal owners and herders. They carry general features of a Sindhi rural society. Mostly their villages are based on one or two casts. Inter-family marriages is the common phe-

nomenon here, the choice is mostly first cousin. It was observed during the survey of some villages that normally a village of 1000 population has 6 - 8 persons ageing 28 – 40 are engaged in government employment – mostly teachers or the clerks. Every village of 100 houses has its own masque.

The inland communities subsist by fishing, agriculture, petty-shop-keeping as well as wage labor mostly residing in the large villages or townships. Due to variety in professions their social behavior is pretty different. They are more urbanized than rest of three categories, however in the broader sense they are towards-progress rural population. Presently, land degradation and seawater intrusion has created upheaval in their smooth development and in the social statuesque.

Due to land degradation migrations, decreased livestock and consequently decline in purchasing power, the socio-economic development of rural society has become slower or the reverse. This has resulted in profession change. Majority of all the three casts has adopted fishing profession that ultimately has increased the population pressure on the fisheries resource in the area, causing a high level depletion of the resources.

On the basis of construction material, three types of houses are identified in the study area: Katcha, Pukka, and Semi-pukka. Pukka houses are made of burnt bricks, steel, and timber. There are stone or cement blocks plastered with mud or cement. Timber is used in roofing, doors, windows, and other fixtures. Majority of Puka houses exists in cities and towns.

Most of the lands in coastal areas have been de-

graded due to the frequent seawater floods and the tidal waves of Arabian Sea. Water logging and salinity have also increased in the area, due to the lack of proper drainage facility or the failure of existing projects. Three sources of water avail the communities: untreated canal water; water supply systems and bore holes up to about 80 feet deep in the ground with hand pumps.

Majority of the deaths, particularly children and pregnant women, are caused by malnutrition and use of contaminated water. Usually, ponds are simultaneously used as bathing pools for the animals as well as a source of drinking water for the people. Health facilities are at minimum scale. In the case of natural disasters, especially floods and cyclones, the people suffer greatly, due to communication cut-off with the towns.

2.1.2 Livelihood

Agriculture, fisheries and livestock are the livelihood resources of the communities. Thatta and Badin districts are ideal for the agriculture due to their alluvial soil, depending on Indus River. The main crops produced in Thatta district during Rabi are wheat, barley, gram and oil seeds, rice, maize, millet and jowar in Kharif. Before the land degradation and deterioration of surface and sub soil water aquifer, the date palm flourishes in Jhimpir, coconut trees in Keti Bunder, Mirpur Sakro and bananas are grown in Thatta, Ghorabari and Mirpur Sakro tahsils. Other productions include mango, fig, pomegranate, apple, peach, banana, guava and papaya. Badin is geographically low and flat. Rice is the main crop of the district. The other

crops include cotton, sugarcane jawar, wheat, lentil, peas, maize and barley. In horticulture, a considerable area in Matli taluka is under gardens. It also produces vegetables such as carrot, radish, onion, etc and some fruits like mango, guava, melon and watermelon, etc. However, due to water shortage downstream Kotri, the production of these crops has decreased considerably. In many areas, soil that was fertile earlier has turned into barren land.

Livestock is traditionally part of rural and agriculture economies. In coastal it is more specifically important due to dependency of many communities over this source of livelihood. Meat, milk, butter, hair, hides, skins, wool and eggs are the major products of livestock having good market value. People usually rear camels, ships, cows, buffaloes, goats and hens. Indus Delta's lush green mangrove and reverine forrests had remained ideal for livestock grazing, not only for the local communities but for almost whole of Sindh. The deltaic region remained famous for its milk, ghee, butter and other associated products of livestock.

The majority of deltaic population depends on fisheries, therefore it also provide the bases of other minor trades and occupations indirectly, being a basic factor behind the purchasing power of majority. In 1999, Sindh coast [Indus Delta] contributed 333,047 in the country's overall marine fish production of 474,665 metric tones, despite the fact that Sindh covers 350 km out of 1050 km coastline of Pakistan, while rest of the area falls under Balochitan. Almost whole Sindh coastline is part of Indus Delta region. Due to drastic reduction in downstream Kotri water discharge and other reasons a considerable

reduction in mangrove forest coverage is witnessed. This, accompanied with unsustainable fisheries, is becoming a cause of depleting fisheries reservoirs.

Both the agriculture and fishing communities are exploited through different means and modes.

The growers take credit for purchasing pesticides and seeds from a middleman of vegetable/fruit markets locally known as 'Aarti.' After receiving credit from the middleman' they are bound not to auction produce in the open market. They hand over their produce to the Aartis to auction. Aartis are notorious for striking deals with the businessmen to auction agriculture produce on lower prices.

The exploitation of fishermen is more complex. Three types of private credit observed in the study area that include Credit on Shares/Patti System, High Interest Money Lending and Fish-Catch Bounding Credit. The last one further could be categorize into two: Sell Bounding Credit and Mole-holder's Credit. These credit systems have different mechanism of operation, thereby different methods of exploitation.

3. DISASTER PRONE AREAS OF INDUS DELTA

3.1 BADIN

3.1.1 Population

As per 1998 Census, the population of Badin district was 1.1083 Million with rural populace of 0.925 Million, i.e. 84%, and urban populace of 0.173 million. Taluka population were: Badin: 0.347 Million, Golarchi: 0.193 Million, Malti: 0.275 Million, and Tando Bago : 0.293 Million.

The talukas comprising of present Badin district had a population of 0.256 million in 1951, 0.333 million in 1961, 0.607 million in 1972 and 0.776 million in 1981. The district population has quadrupled at an average annual growth rate of 3.22 per cent during the past 47 years. The towns/urban localities include Badin, Matli, Talhar, Golarchi, Kario Ganhwar, Tando Bago, and Tando Ghulam Ali, Pangrio and Shadi Large. The rural domain extends to 1547 villages of various sizes and a total population of about 0.778 million.

3.1.2 Human Resources

Both, males and females usually have a working age of 15-64 years. They comprise of about 52 percent of district according to 1998 census. Only 17.96 percent of the district population is economically active at the aggregate level. The proportion of economically active people in urban areas is higher at 21.70 percent compared to 17.22 per cent population in rural areas. About 33 percent

males are economically active, while the population of females is quite low at 3.62 percent in urban areas and 1.4 percent in rural areas.

The figures show that 63.62 percent of labor force is self-employed. Majority form the male workers who are 66.48 percent and are engaged in agriculture and other trades as compared to only 12.13 percent self employed women. About 16.74 percent working females are employed in government sector in the urban areas as compared to only 3.95 percent in rural areas. Some 30.19 percent of working urban males are employed by private sector as compared to only 9.2 percent rural males employed. The women workers get low wages in private sector comparatively to male. Maximum cash wage in agriculture sector is Rs. 60 per day for men and Rs. 40 per day for women workers.

At the time of census 1998, unemployed proportion of economically active population was 33.22 percent. The number of economically active population is projected to increase to 16.27, 17.92 and 20.47 thousands in 2001, 2005 and 2010 respectively, for which new jobs will be required in Badin district.

3.1.3 Housing

In Badin district, according to the 1998 Census, the total number of housing units was 101,669 out of which Pucca households were 11,553 [about 11 percent]; Pucca / Kutcha houses 10,501 or about 10 percent; Katcha houses 40,986 [about 41 percent]; *Jhugies* -huts were 36,478 [about 36 percent. While the temporary housing units such as tents and *wandhs*–straw wrapped houses

were recorded to be only 2151 or about 2 percent. The pressure on housing could be judged by the average household size, persons per room and rooms per housing unit. The housing units with 2, 3,4, and 5, rooms and more were only 5.30, 4.08 percent, 1.30 percent and 0.63 percent respectively, while housing units with one room were 81.82 percent in 1998. In urban areas, the proportion of 10 or more persons per housing unit is 15 percent. About one -fourth housing units have a household size of 3-4 and 5-6 persons. The pressure of persons per housing unit is high in urban areas as compared to rural areas. The proportion of one room housing units [about 82 percent], mostly located in rural areas, is an indicator of widespread poverty of opportunity in rural Badin.

3.1.4 Drinking Water & Electricity

Drinking water facility inside the house from water supply is available to only 13% housing units that are mainly in the urban areas. More hand pups are installed in urban areas than the rural. That is 25.99 percent of the housing units in urban contrasting 14.03 percent of the rural areas. In all the 1547 human rural settlements surveyed during the 1998 Census, there were 8825 hand pumps, 280 wells, 33 tube wells and 191 ponds/ tanks. It was recorded that out of these surveyed settlements, 913 fetched drinking water form nearby canals, distributaries and watercourses.

In rural areas, majority of households fetches water from irrigation channels and other water bodies. Out of the 134 rural settlements of population size 1000 and above, only 30 had the water supply schemes in 1998. Cri-

sis of drinking water is further severe when the canals and watercourses undergo *Warabandi* –scheduled closure for irrigation. The underground water being brackish in most parts of Badin district, the shortage of freshwater downstream Kotri has caused a serious problem of non-availability of potable water in recent years.

Electricity is available in about 77 percent housing units in urban areas and 28 percent units in rural areas of Badin district. The total number of domestic connections was only 17922 or about 18 percent of the housing units in 1998. From the 1547 rural settlements surveyed during the 1998 Census, only 578 villages had the electricity. More than 70 percent housing units use Kerosene oil for lighting in the rural areas. Fuel wood use for cooking is 93.64 percent followed by Kerosene oil [3.25 percent] in rural areas. Even in urban areas, cooking fuel is once again wood at 49.83 percent, followed by Gas [22 percent] and Kerosene oil. This shows that, due to the lack of gas connections, the pressure on the already limited forestry resources in Badin is unduly very high causing deforestation and denudation of the rural landscape.

3.1.5 Education

The overall literacy rate in Badin district has risen from 24.89 percent in 1998 to 27.52 percent in 2001, witnessing 2.89 percent increase. Matli Taluka stands at top with 27.95 percent literate of both sexes followed by Badin at 26.96 percent, Tando Bago at 23.13 percent and Golarchi with 17.83 percent. In all talukas, the literacy ratio of urban areas is higher than rural areas – 48.49 percent for both sexes for Tando Bago, followed by Matli

with 48 percent, Badin with 43.8 percent and Golarchi at 34 percent. Male literacy ratio is higher than females in all cases. The male and female literacy ratios were 35.07 percent and 12.9 percent respectively in 1998. The literacy ratio for males in age group 15-19 years in all cases is higher than the other age groups. As regards female literacy, it is generally higher for the age group 10-14 years. This indicates that young persons, especially women, are more literate than the older population.

The first tier of school system, especially in the rural areas, is the Mosque schools. Badin district had 371 mosque schools in 1998, with 812 primary schools for boys and 214 primary school for girls. Thirty six students average were enrolled per school against the capacity of 150 students. The number of functional schools needs to be enhanced in the district. While, in the far-flung small villages and the settlements in coastal areas need special programs for literacy and primary education. There are still some 735 settlements with 200 and above population that do not have a primary school.

In 1998, there were 52 middle schools for boys and 22 for girls in Badin district in 1998. on an average, 40 students were enrolled in each middle school. In view of the population in age group 9-14 years, it is estimated that the number of middle school needs to be doubled during the next decade. Recent information reveals that the district government has made significant efforts in this regard. However, there are still as many 111 settlements with 1000 and above population that do not have middle school for boys. The number of middle schools for girls is even lower and there are 117 settlements of population

1000 and above where there is no girl's primary school. There is no middle school for girls in any rural settlement up to 500 population size in Badin and Golarchi talukas.

There were 15 high schools for boys and 2 high schools for girls in Badin district with an average of enrolment of 288 students per school during 1999-2000. According to 1998 Census, the population in age group 14-16 years for both sexes is 52,270. 'If the whole population of this age group were to be enrolled, there would be a need for 136 more high schools by the year 2010.' Out of the 134 rural settlements of population 1000 and above, 132 lack the high school education facilities for girls. There are currently four higher secondary schools in the district-3 for boys and 1 for girls. Hostel facilities are available at the Mir Ghulam Mohammad Khan Talpur Higher Secondary School, Tando Bago. Rest of the high schools lack hostel facilities. Hence, the students from distant rural areas, specially the girls, are unable to avail high school education.

There were 2 degree colleges each for boys and girls in Badin district during 1999-2000. Student enrolment in these colleges was 2787 and 881 for male and female college teachers have, however, registered a decrease from 67 to 30 and 21 to 15 respectively between 1995-96 to 1998-99, due to the continued ban on recruitment in Sindh province.

There are three technical institutes in Badin district only one of these i.e. the Government Poly-Technical Institute Badin is functional with a small number of staff and enrolment. The two Mono-Technical institutes have not yet started their training programs. A private sector

computer-training centre is also operational at Badin. Reportedly, there is also one vocational school for women with very limited admission mostly in sewing and handicraft trades.

3.1.6 Health

Health facilities are quite inadequate in Badin. According to the EDO [Health] office, the health infrastructure of Badin district includes one civil hospital, 3 Talukas hospitals, 12 Rural Health Centres, 38 basic Health units, one M.C. Health Care Centre with 20 beds and 69 Government dispensaries in addition to 28 experimental dispensaries.

There are 317 sanctioned positions for male Medical Officers, 60 female Medical Officer, 15 Lady Health Visitors, and 44 Female Health Technicians. However, much lower than these sanctioned posts. The population per doctor was calculated to be 5428 persons Badin district in 2001.

There were only 6 RHCs in the district during 2000-01, catering to the needs of about 1.2 Million people. The pressure on RHCs is likely to increase further with the projected growth of rural population till the year 2010. Basic Health Units provide primary health care services in rural areas. There were only 41 B.H.Us in 2000 with an average patient population of 29,271. According to 1998 Census, there was one hospital for 227,208 persons; this number increased to 240,020 persons per hospital by the year 2000. Hence, there is an immense pressure on the present health infrastructure. There is a high incidence of infant and maternal death in rural areas, which

could be prevented by providing basic health facilities at community level.

There were only 360 beds in the district hospitals, dispensaries, R.H. Centres and Basis Health Units in Badin district in the year 2000. Average, there were 3156 and 3334 persons per bed in the district in 1998 and 2000. More hospitals and beds are, therefore, immediately needed to extend the health services properly. There is no MCH Centre in the entire district to cater to the specific treatment needs of women of reproductive age.

3.1.7 Water Supply & Sanitation

Canals and watercourses are the main source of drinking water for villages as well as urban water supply schemes. The coastal communities is the severe shortage of drinking water due to shortage of freshwater down-stream Kotri. Majority of the coastal communities usually purchases water cans at heavy prices, making them more economically vulnerable. The water purchased and con-sumed is excessively unhygienic as well resulting in the outbreak of many water- borne Diseases.

It is revealed that water supply schemes serve only 3.3 percent of rural population, majority of whom [about 65 percent] are still fetching drinking water from wells, ponds, depressions and hand pumps installed outside their houses. The number of hand pumps has recently grown to be 8828 although most of these supply brackish water. The open wells, ponds and other water bodies generally receive agricultural run-off and drainage effluents, which are unhygienic and harmful for human health. Unreliable and decreasing flows of freshwater downstream Kotri has

created severe shortage of drinking water in many urban localities in Thatta and Badin district in recent years. This trend is likely to continue necessitating an integrated plan for the developed of potable water resources in the coastal districts including Badin.

Over 62 percent population in rural areas of Badin district is devoid of any latrine and/or bathroom facility inside the housing. In rural areas, most housing units have open-air kitchens in which firewood is the main source of fuel. The smoke as well as the solid food wastes causes serious health and sanitation problems.

3.1.8 More vulnerable areas: Union Councils: Bhugra Memon, Ahmed Rajo and Kadhan.

The Badin District administration has drawn a map of more vulnerable areas of Badin District that include southern part of Union Council Bhugra Memon, Ahmed Rajo and Kadhan. These areas are just a few inches above sea level, where tidal waves of the sea come twice a day without fail. And, in the case of any tempest, cyclone or tsunami, this whole area is hit hard by the natural disasters without any assistance from the local authorities. There is no system of early warning in case of any disaster by the district administration nor there is any substantial support from civil society organizations for the common fisher-folk. Thus, the people are made to suffer helplessly and remain on mercy of nature at the time of calamity. This is what the field study reveals.

The federal government headed by Nawaz Sharif had ordered construction of 180 cemented shelters for the rescue of the fisher-folk soon after the Cyclone-1999 dur-

ing his visit to the calamity-hit area; but up to January 2006, the shelter-houses were not in complete order nor were they handed over to the affected of the disaster.

The civil society organizations have also attempted to help the deltaic people through advocacy campaign by and large whereas the Pakistan Fisher-folk Forum (PFF) has initiated a project of shelter-houses construction on a limited scale. The OXFAM, ACTIONAID, YOUNG SHEEDI and UNDP etc also have conducted certain studies to that effect, but it all seldom provides adequate relief to the fisher-folk in times of any disaster.

3.2 THATTA

3.2.1 Population

The population of all nine talukas of Thatta District, according to the 1998 Census, was 1.113 million. The census record indicates that the population of the talukas comprising the present Thatta District was 0.286 million in 1951, 1.361 million in 1961, 0.676 million in 1972 and 0.761 million in 1981. Mirpur Bathoro is the most densely populated taluka followed by Sujawal and Thatta - all three being non-coastal areas. Due to vast coastal zone, the district had one of the lowest population densities of 64.1 persons per kilometer only in 1998.

The rural population of the District was 0.988 million constituting 88.8 percent of the total population in 1998. The average growth rate in rural population between 1981-98 was recorded to be 2.15 percent with higher sex ratio - males being 112.96 percent of females. Islam is the predominant religion with about 97 percent people being

Muslims. Sindhi is the major mother tongue spoken by about 96 percent people. The age structure of 18 years and above was recorded to be 52.32 percent of total population; while the percentage of working population aged 15 to 64 years was 53.21 in 1998. The entire District has board-based population pyramid indicating a high proportion of population at younger age groups; with 68 percent of people currently married and 47.26 percent of total females in reproductive ages [15 to 49 years].

3.2.2 Human Resources and Employment

The economically active population is 25 percent of the total number and 37 percent of the population aged 10 years and above. A high unemployment rate of 17.82 percent was recorded in Thatta district in 1998. Two third of the total employed persons is engaged in primary occupation namely agriculture, forestry, fishing and hunting. The district had 30 large industrial units including 5 sugar mills, 9 textile mills, 2 paper mills, 1 jute mill, 3 salt works, 3 flour mills, 1 PVC industry, 1 Garment industry, 1 industrial Gas concern, 1 specialised Textile unit, and 2 Ice factories, in addition to several rice milling units in rural areas. Other than the sugar mills, which are rural-based, almost all-larger industrial concerns, are located at Gharo and Dabeji area adjacent to Karachi. Recent additions to the industrial units are the Car manufacturing plants near Budho Talpur, belonging to the Deevan Group, adjacent to the Deevan Sugar Mills. The group also reportedly employs non-local population in large numbers.

3.2.3 Education

Literacy ration in Thatta district was reported to be 22.14 percent in 1998. The male literacy ratio was about three times higher at 31.58 percent when compared to 11.4 percent for females. The ratio is urban areas was much higher at about 46 percent compared to only about 19 percent in rural areas. There is a wider gap between males and females in rural areas where literacy ratio for males is 28 percent compared to only about 8 percent for the females. Of the total educated persons, 35 percent have passed primary, 13 percent middle, and 13.32 percent matriculation. After matriculation, percentage falls to 6.14 for intermediate, 3.43 for graduates and 1.6 for postgraduates.

3.2.4 Housing

More then 78 percent housing units in Thatta district are one-room houses. Housing units with 2-4 rooms are about 38 percent in urban areas compared to only about 19 percent in rural areas. There are about 4 persons per room in Thatta district. About 94 percent houses are owned. More than one-half of the housing units were constructed at least 10 years ago. Only about 2 percent housing units are currently under construction, depicting thereby that there is shortage of finances for the construction industry. Two-thirds of the housing units are constructed with wood and bamboo. Only about 14 percent houses are Pucca [made of baked bricks and / or stone] in the rural areas.

3.2.5 Electricity, Water Supply and Sanitation

Electricity is available only in 21.41 percent rural housing units. While kerosene oil is still used in 77.39 percent of rural dwellings. Firewood is used as cooking fuel in about 91 percent of rural households as against 76.5 percent of urban houses. Only about 38 percent of the rural housing units have separate kitchen facility. About 35 percent of the rural households have separate bathroom facility. While one third of rural housing units do have a separate latrine, about 50 percent do not have this facility. The residents of such units use adjacent rural environs as latrines causing sanitation problems nearby villages.

Thatta district is very poor is terms of the indicator of piped water, which is available to only about 15 percent of the housing units. About 13 percent of the rural house-holds have hand pump inside the housing units; while 16 percent use outside ponds for fetching water and 6 percent of housing units use dug wells. Being at the tail end of the Indus river basin system, Thatta district is currently facing the worst ever freshwater crises is modern history due to the non-release of water in the downstream of Kotri Bar-rage. Drinking water is being purchased at high cost in most coastal settlements.

3.2.6 Health Infrastructure

Three out of six coastal talukas do not have any R.H.C. as well as any veterinary dispensary. The B.H.Us and dispensaries are also in small number. On an average, it is depicted that there is a dispensary with one Compo under for about 5000 people in the coastal talukas.

3.2.7 More vulnerable areas: Ja'ati, Keti Bandar, Kharo Chhan, Ghora Bari, Mirpur Sakro and Shah Bandar

According to the survey of the district administration of Thatta, the most vulnerable areas of Thatta district pertaining to the natural and man-made disasters are Ja'ati, Keti Bandar, Kharo Chhan, Ghora Bari, Mirpur Sakro and Shah Bandar. The delta area of Thatta District covers largest part of the province in comparison with Badin District and Karachi's fishing villages having population well above 100,000 souls. During the Cyclone 1999, the Jaati area of Thatta district had suffered the most. The dead human bodies were being recovered from bushes of the mangrove trees of the area many months after the onslaught of the disaster. The number of casualties was also high in Thatta during 1999 disaster. The man -made disasters have also taken heavy toll of the Thatta District, where local administration pays very little heed to the woeful condition of the fisher-folk. One of the reasons of such apathy is the non-indigenous ruling clique of the area

4. CHRONOLOGY OF NATURAL DISASTERS IN INDUS DELTA

A chronology of natural disasters over the last five decades reveals that the disaster prone districts (Thatto & Badin) of Indus Delta remained in the grip of an uninterrupted cycle of disasters in one form or the other. Cyclones, heavy rainfalls, droughts and floods follow each other with short-lived intervals. Major disastrous events in Thatta are recorded as: 1. Cyclone 1964-65; 2. Heavy Rainfall 1973; 3. Floods 1976; 4. Floods 1988; 5. Heavy rainfall 1994; 6. Cyclone 1999; 7. Earthquake 2001; and 8. Floods 2003.

4.1 Cyclones in a Century

At least 222 cyclones have developed on Sindh coast in last century as per data revealed by the Met Office, Karachi. Of these, at least eight cyclones have hit the Balochistan and Sindh coasts between 1891 and 1991. However, only two of them were devastating in nature. The last major cyclone that hit the Sindh coast was in

1948. The record of pre-partition cyclones is retained by the India Met office. Such process of study was initiated by during the British rule in India from 1891 and onwards. Since then, ten cyclones have struck the area from Sindh coast to Mekran coast. From 1891 to 1947 seven cyclones have hit the Sindh coast. But from 1947 to 1999, only one storm and two cyclones have hit the Pakistan coast.

4.2 Quake History of Sindh Coast

An image search on the Internet will reveal that Karachi lies very close to a major fault line, where the Indian tectonic plate meets the Arabian tectonic plate. According to seismologists, up to 95 per cent of all recorded earthquakes have taken place along fault lines, where two or more tectonic plates meet.

For an even closer look at lower Sindh's seismicity, one can take a look at the website of the India-based Amateur Seismic Center (http://asc-india.org) which has extensive details on the earthquake history of South Asia. For instance, while Karachi lies close to a major fault line, it is situated on or close to four minor faults. The first is called the Allah Bund fault and it passes through the coastal town of Shah Bundar, the area around Pakistan Steel Mills and runs through eastern parts of the city ending near Cape Monz. Another fault lies in the Rann of Kutch near Sindh's southeastern border with India.
The third is called the Pubb fault, which lies near the Mekran coast west of the city while a fourth is located in Dadu district on the northern boundary of Karachi.

According to the website, which quotes from extensive scientific and historical sources (all cited), a mas-

Table1: Chronology of Cyclone hitting Pakistan Coast		
Date	**Land Fall**	**Gravity**
June 14-18, 1895	Landfall on Makran Coast between Pasni and Gwadar	25.5N 63.7E
April 25- May 5, 1901	Landfall near Jiwani	25.5N 62.6E
May 7-14, 1902	Landfall-centered 80 miles southern from Karachi near Keti Bandar	24N 67.3E
June 11-16, 1902	Hit the coast near Soan-miani	26N 67.5E
June 11-16, 1902	Hit the coast near Karachi	26N 66.3E
June 18-20, 1907	Died in the sea	23.4 N67.5E
September 16-20, 1926	Struck Gujrat Coast, turned back to sea and hit Sindh coast southeast Karachi	-----
June 5-9, 1948	Cyclone storm crossed Karachi lands uprooting the tents of refugees	25.5N 67.8E
Nov 10-5, 1993	Centered at Keti Bandar	-----
May 10-19, 1999	Centered at Seer Creek	-----
Source: Official record available at Meteorological Department		

sive earthquake measuring 7.5 hit Debal east of present day Karachi in the Indus Delta in either 893 or 894 AD. Up to 150,000 people were believed to have died and the temblor resulted in the Indus River changing its course westward. To the north of Debal, near present-day Hyderabad, the towns of Bahmanadad and Mansura were badly affected. They were important cities in the region and suddenly disappeared from the historical record. Archeological excavations at the sites reveal "human bones, which were found in doorways, as if people were attempting to escape, or in the comers of rooms, some upright, some recumbent, with their faces down and some crouched in a sitting posture" as quoted by A. Cunningham in his "The Ancient Geography of India" (Delhi,

1871).

On May 2, 1668, a quake measuring 7.6 hit the Sindh coastal village of Shah Bundar destroying it. On June 16, 1819, a quake measuring 7.5 on the Richter scale hit parts of western India and present-day Sindh. Its epicentre was 185 miles east-southeast of Karachi in the Rann of Kutch. Over 1,500 were believed to have died in the quake. The earthquake resulted in the raising by 4.3 metres of an approximately 90-kilometre long stretch of land. A representative of the British governor at Bhuj said that the shaking lasted nearly two minutes. A tributary flowing into the Indus was also thought to have dried up as a result and the tremor was strongly felt in Hyderabad, Sindh. Aftershocks to this quake went on for several months but gradually decreased in magnitude.

More than 4,000 people were killed on the Mekran coast by an earthquake and a tsunami that followed it in 1945. The quake occurred on Nov. 28 and its epicentre was 98.5 kilometres southeast of Gwadar or 408 kilometres west of Karachi. In Karachi, the quake was felt for 30 seconds.

Lighthouses at Cape Monze and Manora were both damaged and the shockwave was felt as far east as Kanpur. Tsunamis generated by the quake reached heights of 40 feet in some Mekran ports and caused great damage including wiping out the fishing village of Khudi, 30 miles west of Karachi. At Karachi, the waves were recorded at a height of 6.5 feet and came in intervals, with the first coming at 5.30am, then at 7 am, 7.15 am and finally at 8.15 am. Luckily there was no damage to the boats at the port or to any of its installations. A tsumani

close to seven feet high was recorded at Mumbai and 15 people were washed away there.

Even the Gujarat earthquake of 2001 which killed thousands in India was strongly felt in Karachi and Hyderabad (where a seven-storied building collapsed), the former being a mere 235 miles from the quake's epicenter.

It should be clear that Karachi lies in a zone with some degree of seismic activity. In fact, the Geological Survey of Pakistan's national seismic hazard map places the entire Sindh coastline including Karachi in a zone of "noticeable seismic danger". It has also placed a detailed note on its website saying that the Oct. 8 quake has made it "mandatory" to update the existing National Seismic Hazard Map.

4.3 Cyclone - 02A 1999

Tropical Cyclone (TC) 02A was the only 1999 cyclone that was warned on by JTWC in the Arabian Sea developed in the Laccadive Sea in mid-May and initially moved northwest before turning toward the northeast. TC 02A reached a maximum intensity of 110 kt while on a northeast heading, just before making landfall approximately 97 nm southeast of Karachi at 200600Z May.

Tropical Cyclone 02A developed in the southwest monsoonal flow during mid-May. The area of convection was discussed on the ABIO for 2 weeks before the cyclone developed. During that time, strong convection would develop just before sunrise, at the diurnal convective maximum, and subsequently dissipate around sunset.

The first warning was issued at 160900Z May with northwestward movement. TC 02A subsequently reached

typhoon intensity on 170600Z May, after which a mid-latitude trough passing through the Middle East significantly weakened the subtropical ridge, allowing the system to re-curve into Pakistan. By 190000Z May, the cyclone reached its maximum intensity of 110 kt, which it maintained through 200600Z May. TC 02A made landfall near Karachi, Pakistan as a 110 kt tropical cyclone. JTWC issued the 21st and final warning on 210900Z May as the system moved into the Indus River valley.

But, no pre-disaster warning ever reached any fisherman and fishing boat on 200 km long Sindh coast and 5,000 sq miles Indus Delta having human population of 2.7 million. The fishers were caught by surprise, when cyclone hit them; they found no rescue from the disaster except it that they were left at the mercy of the calamity. Those, who survived were lucky; and those, who perished were destined as such. The ravages of the disaster were such that the dead human bodies were collected from the bushes of mangroves in Seer Creek even after lapse of two years.

TC 02A was one of the most intense cyclones on record to develop in the Arabian Sea. Reports by Agence France-Presse indicated that 700 people were reported missing and presumed dead, including 11 paramilitary soldiers who were lost during a rescue attempt at sea. Total damage was estimated at $6 million.

4.3.1 Official Data

The official reports by the Government of Sindh put the death toll at 189, and number of missing people at 150; but the independent sources put the figure of dead and missing around 1,000. The Government announced

that Rs. 100,000 were paid as compensation to the those deceased, who were lone earning members of the family, while Rs. 30,000 were paid each to the families of other victims.

The official data released by the Relief Commissioner said a total number of 76,827 houses were totally damaged in both districts of Thatta and Badin during onslaught of the cyclone. The number of damaged houses in Badin was 51,293, and in Thatta, it was 25,534. The partially damaged houses in both districts were 61,602. An independent source (SZABIST) claimed that 80% of the houses in both the districts were fully damaged; the Army supplied some tents to the affected families, while the Government survey teams were reluctant to include the losses of shelters, damaged mosques and Otaqs (private guest houses) etc. The Monitoring Cell of the office of Divisional Commissioner, Hyderabad as well as Relief Commissioner's Office at Karachi put the number of boats lost as 669 (66 in Badin district, and 609 in Thatta district. But, independent sources said the boats lost were in thousands.

According to an independent source (Thardeep, Mithi), more than 100,000 goats perished in 1999 cyclone only in Thar Desert. The loss of livestock during the cyclone in Thatta and Badin districts was 10,885 cattle dead or missing in Thatta, and 17,211 in Badin. The extent of loss to livestock in Cyclone 1999 was also visible from the presence of animals' carcasses lying on roadside at a number of places in the vast plains of Delta in both districts of Thatta and Badin. Such a spectacle was witnessed time and again during field visit in the affected area.

The Sindh Agriculture Department report said major crops of cotton, sugarcane, paddy, chilli, banana, mangoes, watermelon, pan and jaman were badly damaged in disaster.

There was no relief for the submerged people in hundreds of fishing villages as neither civilian nor military authorities used boats for evacuation or other purposes of aid.

4.3.2 Six-Year Long Devastation

The Cyclone 02A that hit Sindh coast including Thatta and Badin districts completely ravaged the coastal communities causing unprecedented and irrecoverable damage to human inhibition, their livelihood, natural environment and ecology besides the rural infrastructure. The fishermen lost their fishing boats, fishing nets, while tsunami-like tidal waves destroyed depressions by filling them with sand, where prior to the cyclone water used to be stored, the fish grown and fishing activity continued. So, this disastrous cyclone also destroyed a large number of fishing grounds in the Indus Delta Eco-Region. It proved to be detrimental to the livelihood of the fisherfolk.

The people of delta revealed during individual and group interviews that it was only after six long years in 2005 that they first time saw sweet river water flowing in the Indus Delta through Mirwah. With it, some vegetation became visible in the area and some crops were also harvested first time after the cyclone of 1999.

4.3.3 WOEFUL TALES OF DISASTER

Victim: Issa Mallah of village Khamoon Malah

'When the Cyclone-1999 hit our village, all our straw huts were blown away. A single hut built on an elevated mound was somewhat safe in which we all villagers took refuge. The situation was such that each and every moment was the moment of death. The hut was swinging. We all men caught hold of the pillars on which stood the hut. Thus we saved the hut from falling down on the ground, and with it we also saved our lives.

'Only those villagers were saved who managed to climb up the nearby mound of the sand. Those who could not take refuge there lost everything of theirs.

'At the time of cyclone, our boys were gone after

fish-hunt. We were all the time highly worried about their lives. Thank God, they came back safe after the storm was subsided, but lost their fishing boats and nets completely.'

He was Issa Malah, an inhabitant of a vulnerable village Khamoon Malah of Union Council Bhugra Memon of Badin Taluka (sub-division) narrating the nature of calamity that hit them in between the night of May 19 and 20 of the year 1999.

He said, he had seen the cyclone of 1965 too, in which one of his cousins perished; but the horror of the Cyclone 1999 was terrifying. The 1999 calamity was more disastrous in which all cattle-heads of our village perished. A mosque built with baked bricks by one Lakhano Malah (in Zero Point area of LBOD) just disappeared during the cyclonic winds.

In reply to a question, he revealed that when the cyclone had already hit the area, a man from Mukhtiarkar (Revenue Officer) of Badin Taluka arrived in a jeep to tell us to vacate the area. 'Our fishing boats didn't get early warning, and therefore were persished.'

Issa Mallah, however, told that that the earthquake of 2001 that destroyed Ahmedabad and Bhuj of India and damaged Diplo and Nagarparkar area of Sindh's Thar Desert besides creating holes in the soil of Kadhan in Badin district seldom caused any damage in the deltaic area of Badin.

Victim: Mai SABHAI,
Guardian of Dodo Soomro's mausoleum

When a question was put to her about the ravages of Cyclone 1999, she said, 'My son! don't ask such a question; the horror pertaining to that 'Doofa'an' (storm) still haunts my heart and horrifies me. My body just starts trembling when I remember those moments of hell.

The cyclone hit us when we were sleeping. The gusty winds brought tidal waves that overpowered us. We got up from slumber, as we felt as if we were drowning in water.
Then, we rushed to the mausoleum of Dodo Soomro, which is constructed on an elevated platform. Here we had some relief at least from flooding water. However, the ordeal continued for two or three days.
And, when the onslaught of calamity ended, we had nothing but a brackish water to drink. The water was such that anyone, who drank it was affected by diarrhea. It was only in the year 2005 that we saw some sweet water in the Mir Wah (canal) after six long years of drought.

Victim: Fishermen of Narerhi Lake

Inhabitants of a big village of Goongro Tarr within periphery of Narerhi Lake in Golarchi Taluka of Badin District told during group interview that the Cyclone-1999 started at 6 p.m. on May 19. The disastrous winds continued for 36 hours. For the period of 24 hours, our houses were damaged, but still were intact; however for the rest of the 12 hours, they were no more. All straw huts had just flown away. It looked as if the blade of some bulldozer

had just erased everything on the ground.
The fishermen told that noise of the tempest was so forcible that communication even between family members was impossible. We used to whisper into each other's ears saying that perhaps all other people of the area had been killed except us, who were whispering to each other. We had some blanket, (a rali or a razai, in vernacular) in hand with which we kept our children intact.

In our immediate vicinity, seven of our men died during the cyclone. The number of others, who died ran in hundreds, who had gone to fish in Narerhi Lake spread in 150 miles.

The local people suggested that to save the population of this area, their houses should be built on elevated mounds, at least 7 or 8 feet above ground level.

4.4 EARTHQUAKE - 2001

The human habitat in some parts of Thar Desert adjoining the Indus Delta lost the potential of sustaining human and animal life after disastrous earthquake of January 26, 2001.

Although the desert of Thar falls into zero danger-zone of seismic activity, and there were, mercifully, few human casualties, however, a survey conducted at Nagar-parkar, Diplo, Badin, Rehmaki Bazar and the Rann of Katchh revealed that irreparable damage had been caused to the human habitat in areas of Thar adjoining the Rann of Katchh stretching to southeastern corner of the Indus Delta.

The province of Sindh, along with its capital city of Karachi, the biggest urban centre of Pakistan, was miraculously saved from a horrible ordeal caused by the earthquake in neighboring India. And with it, the Indus Delta was also saved on a great extent. Though the earth was torn apart near Badin; and on Kadhan road in close vicinity of Badin had developed holes in the earth where from black and bitter water oozed out to the height of 30 feet above ground level, yet there was no substantial damage in the active deltaic area of Thatta and Badin districts.

The desert town of Diplo was only 36 miles from the epicenter of the earthquake, which is 18 miles to the northeast of Bhuj on the other side of the Rann of Katchh. Diplo is separated from the epicenter by 12 miles of Thar's sand dunes and 24 miles of Rann of Katchh in the immediate south.

Badin was only 90 kilometers from the epicenter of the earthquake whereas Bhuj is 200 kilometers away and Ahmedabad still farther from the danger point. In the absence of any proper scientific study and seismic research, a hypothetical analysis developed by the people well versed with the history of Thar indicates that Sindh, along with Karachi, was saved by the Rann of Katchh, the

desert of Thar and the Indus Delta. According to them, the waves from the epicenter passed from the water and sand quite smoothly. The Rann of Katchh and deltaic region of Sindh contain the highest water table while the land of the Thar is composed of sand dunes that restricted the jolts of earth. They also believed that the granite stone formation of Karoonjhar Mountain of Nagarparkar having volcanic activity in the past also saved Thar desert from disappearing from the map of the world. It was quite visible at the Nagarparkar town that the houses built at the foot of Karoonjhar mountain remained unaffected during the earthquake whereas all other houses in the town were damaged.

The relief provided to the Thar by the Sindh government in post-quake period can only be termed as ridiculous as only 50 people in a village of 500 souls received tents with inscriptions of the Red Cross. The peoples of Thar were badly in need of tents as they still remained outdoor at night because of the aftershocks, which continued for months together.

The provincial Government of Sindh announced Rs 2,000 for the repairs of a broken house, and Rs 5,000 for a house fully destroyed. This was making a joke of the misery of the masses who couldn't purchase even a single door for their house for Rs 2000, what to talk of rebuilding a two-room cemented house for Rs 5000.

The damage caused to the desert by the earthquake was unprecedented. The Thari people have experienced a persistent drought since 1994, and were hit by the 02A Cyclone in May 1999 and a famine in early 2000 had already visited them. They were engaged in seasonal migration to the barrage areas leaving their homes and the

hearths when this tragedy took place. The killer quake shattered the structures of their water wells and filled them with black and bitter water or the raw sand making them unusable.

The earth itself was torn apart after developing big and small holes from where oozed out poisonous water destroying the farmlands. From the salt mines, more than a hundred on Thar-Rann border, gushed out poisonous fluid on to the adjoining areas of the Thar and Badin. Widespread destruction took place. Most of the extensive longitudinal sand dunes of the Thar, 3 to 15 kilometers long with a relief of 20 to 100 meters, were torn apart at their top as well as on the slopes.

In all, about 500 villages, right from Kadhan in district Badin to the adjoining areas of the Rann of Katchh including Rehmaki Bazar, Diplo, Nagarparkar and Virawah in Thar were hit hard and no cemented building remained safe. The cracks on the buildings were visible everywhere in the urban areas of the Thar such as Islamkot, Mithi, Umarkot, Chhachhro etc.

In Diplo, having a population of 14,000, hardly 10 per cent of the houses were safe to live in. The whole of Nagarparkar town gave a look of an archaeological site where no house structure was unaffected. A number of houses in Islamkot, Mithi, Dano Dandhal, Chhachhro and Umarkot were badly damaged.

But, the biggest loss of the Thar was the destruction of its sweet water underground reserves. The inhabitants of the affected areas, therefore, will have to move on to some other areas where they can find sweet water for human consumption and green leaves for their livestock.

Almost all archaeological sites of the Thar suffered damage. They include Gori temple, Bhodesar mosque, Jain temple of Nagarparkar, Jamia Masjid Diplo, temple of Kharirio, Looni mosque and Sardharo tirath. Sindh's legendary character Marvi and her well at Bhalwa village, however, remained intact.

The people were apprehensive of some drastic environmental impact, which could kill the very potential of the desert to sustain human and animal life any more in the future. Yes, the remedy, in their opinion, could only be abundant rains on the desert. With it, the aquifers underneath the earth would be recharged with sweet water while the saline effects of the poisonous water on agricultural lands would be minimized.

4.5 RAIN FLOODS – 2003

The disastrous rains in 2003 hit more than 164 villages in the two deltaic districts of Badin and Thatta in the province of Sindh, and displaced thousands of fishermen in the affected areas.

As a result of disaster, hundreds of families lost their livelihood, lived in panic, harassment and fear due to prediction of more rains in the offing. A number of families remained stranded in the floodwaters in different areas of both districts even after rains were over.

The Government authorities had a single helicopter at their disposal that was engaged in the affected area of Badin while hundreds of fisher families living on islands surrounded by seawater in the delta area near Keti Bandar and Kharo Chhan were out of reach and there was

no guarantee about their safety.

The Governmental authorities had disconnected supply of electricity to villages and towns in both the districts that created yet another dilemma of hardship for the masses. Almost all electricity polls perished in the flood-hit areas. Shortage of food, potable water and other essential items such as medicines supplemented the difficulties of the affected communities. There was no road, and no transport to reach different towns and localities with essential items to fulfill their urgent need. It was observed that breaches in drainage canals of LBOD, and agriculture wastewater were the major causes of this widespread devastation.

4.5.1 BADIN

The fishermen and farmer communities living in the four Union Councils of Badin faced major devastation by Left Bank Outfall Drain (LBOD), which was ruptured from several places on both embankments simultaneously causing huge displacement of the poor people.

More than 62 villages were vacated and their inhabitants were accommodated in 65 relief camps set up at different schools and other government buildings. People were living on roadsides, canal embankments and under the open sky. The drainage water of LBOD causing floods destroyed entire network of roads, and the communication system of entire area remained disrupted. It was therefore that the authentic figure of flood-related death toll as well as loss of livestock and property could not be ascertained immediately.

The disaster hit the fishing communities coming

within jurisdiction of Union Council Bhugra Memon with a population of about 70,000. The Union Council Kadhan was hit in its entirety while parts of the UC Seerani and UC Lowari Sharif were also affected badly. The floodwater of Kadhan Pateji Outfall Drain (KBOD) - the part of LBOD - totally washed away the villages of coastal belt coming in jurisdiction of Kadhan, Bhugra Memon and Seerani Union Councils and their coastal belt. The disastrous rains were supplemented by breaches in irrigation watercourses and the saline water brought by the gigantic drain (LBOD). It all aggravated the situation during which people had left every thing back home and reached the safer places in emergency. In two or three villages, a few people perished while livestock including goats, sheep and cattle heads were washed away by about 3,000 cusecs of floodwater.

Majority of the people were brought into relief camps and safer places by government with the help of army and police, but the situation was alarming as there was no relief work was taking place effectively. In fact the government agencies distributed essential items only at reachable points, therefore the victims living at far off distance were deprived.

According to information collected by Young Sheedi Welfare Organization (YSWO), the sister organization of PFF, the local administration as well as the government officials failed to provide food and medicines properly to about 50,000 victims, who were brought forth to different relief camps.

A number of fishermen belong to village Khamoon Mallah living at the roadside near Rupa Mari

complained of increasing water-born diseases including diarrhea and vomitting among children and womenfolk. They informed the PFF that they are using the floodwater for drinking and cooking purposes, despite the fact that it is unsafe for human consumption. There was no medicine available to them.

The entire area was giving look of a flooding river. The villages along with their inhabitants including women and children are seen living in knee-deep water. The road from Rupa Mari to Kadhan and from Zero Point and Seerani to Behdamy was no more. About 30,000 people were stranded under the floodwater rising high in the beginning to 8-10 ft but gradually the level declined.

According to a victim Usman Mallah, seven members of a Lund family died, whose relatives were looking for their dead bodies. Similarly three people, two women and a boy, were drowned in Ghazi Khan Lund village.

4.5.2 Affected Villages	**Population**
1. Khamoon Mallah	320
2. Khamoon Mallah-11	209
3. Shadman Lund	278
4. Missri Mallah	225
5. Haji Hajjam	200
6. Hanif Mallah	275
7. Gaji Mallah	150
8. Yousuf Mallah	175
9. Ramzan Sheedi	51
10 .Jumoon Mallah	204
11. Faqir Mohammed Mallah	118

12. Ibrahim Mallah	107
13. Master Allah Bux Mallah	85
14. Haji Ahmed Mallah	93
15. Gul Mohammed Talpur	357
16. Ramzan Khaskheli	103
17. Usman Mallah	230
18. Lakho Pir	2,000
19. Bahadur Khan Lund	300
20. Pir Bux Mandhro	104
21. Yousuf Bhatti	138
22. Mohammed Hassan Mandhro	96
23. Jurio Mallah	180
24. Haji Raboo	50
25. Sono Khan Chandio	120
26. Malhar Mallah	156
27. Rafiq Bengali	54
28. Rafiq Dal	60
29. Tamachi Bajeer	50
30. Photo Chandio	60
31. Ali Shah	72
32. Mohammed Khaskhel	54
33. Manthar Khaskheli	120
34. Adam Khaskheli	120
35. Gudo Khore	42
36. Hashim Mallah	62
37. Samoon	100
38. Ali Bengali	120
39. Anwer Bengali	60
40. Rajab Mallah	54
41. Karo Mallah	78
42. Nawab Ali Jamali	48

43. Mohammed Chandio	60
44. Mohammed Notiar	72
45. Natho Bajeer	54
46. Ramzan Chandio	84
47. Khamiso Dhandhal	48
48. Ahmed Notiar	120
49. Natho Jamali	42
50. Allah Dino Notiar	36
51. Pinyo Mallah	90
52. Sahbdino Jat	180
53. Lakhadino Notiar	60
54. Beer Mallah	90
55. Khan Dal	48
56. Haji Sujawal Jat	60
57. Behdmi	840
58. Allah Rakhio Jat	150
59. Photo Jat	104
60. Murad Malir	1,406
61. Patel Qasim Dal	900
62. Nabi Bux Lund	360

4.5.3 THATTA

In and around Keti Bandar, hundreds of makeshift homes of islanders were collapsed and the families were living under the open sky. Traditionally, these fisher families have been living there permanently facing ups and downs of the seawater movement. The rains floods - 2003 not only affected the islanders adversely but also displaced the people living in several villages in Kharo Chhan and Keti Bandar. Most of the fishermen lost their

boats and nets – the only livelihood resource during devastating rains and consequent flood.

Dearth of potable water in all the villages and their communication with other areas was collapsed. All link-roads that were the major source of communication were completely dilapidated; the people had no alternate to reach each other; especially Jhangisar road, Babeeho road, Johar Malook Shah road and Jooho road were affected badly by rains and devastating floods around the coastal localities.

Unhygienic conditions in camps and villages posed a major problem that created deadly diseases such as gastro and fever among the children. And there was no medicine for them. Snakebite cases were also reported at different places due to which two young men Akbar and Dhaloo of village Sofan Shah lost their lives.

More than 1,000 men, women and children were accommodated at two different relief camps set up in Baghan Camp. Other relief camps were set up in the affected area by the government agencies. The district administration staff was seen running their vehicles in the area but they failed to arrange food, potable water and medicine for the victims. Some 40 affected families were accommodated in a school building of village Haji Ali Bux Murghar. Shafi Murghar told the PFF team that the affected families were shifted in the camp, but there was no relief aid for them from government side.

Most of the fishing boats were ruined during disaster while fishing nets went missing in the floods. Besides, the fishermen were marooned in their villages after rains. Standing crops on hundreds of acres in flood-hit areas es-

pecially tomato, sugarcane, paddy, chilly, vegetables and fruits were totally destroyed. The livestock owners lost such crops, which they use as fodder for their animals in emergency like situation. Livestock is also the major livelihood resource for coastal communities including fishermen.

4.5.4 Affected Villages of Kharo Chhan Population

1.Syed Ghulam Hyder Shah	72
2.Syed Juman Shah	150
3.Hashim Patni	48
4.Natho Ghambheer	60
5.Qasim Utradi	72
6.Haji Mohammed Husain Madir	210
7.Zangi Baloch	120
8.Mamoon Khaskheli	120
9.Ghulam Husain Otho	60
10.Misri Mirbahar	120
11.Tayyab baloch	30
12.Umar Patni	60
13.Ali Patni	60
14.Abdullah Katiar	60
15.Ali Asghar Shah	48
16.Kando Pinyani Baloch	120
17.Yaqoob Shaikh	114
18.Phul Mandeer	108
19.Ismail Katiar	360
20.Usman Patni	102
21.Mamoon Meerbahar	30
22.Usman Katiar	120

23.Suleman Khaskheli	36
24,Pirdad Mundir	126
25.Syed Hasan Shah	90
26.Haji Shah Bukhari	108
27.Ali Mohammed Khaskhcli	42
28.Mohammed Rahim Khaskheli	72
29.Mohammed Misri	60
30.Mohammed Jat	600
31.Mohammed Hasan Kehar	60
32Abdul Rehman Jarejo	90
33.Hashim Jarejo	120
34.Soomar Mallah	72
35.Essa Mallah	48
36.Salih Mallah	90
37.Pir Allah Dino Shah	54
38.Ramzan Mallah	72
39.Abdul Rehman Gagoo	150
40.Pir Hanif Shah	72
41.Husain Khaskheli	90
42.Ramzan Khaskheli	108
43.Urs Mallah	120
44.Adam Jarejo	132
45.Ismail Khaskheli	126
46.Urs Shcedi	90
47.Mohammed Mallah	108
48.Abdullah Mallah	72
49.Ramzan Kehar	90
50.Ahmed Jarejo	96

4.5.5 Affected Villages of Keti Bandar Population

51. Haji Idrees Gabol	300
52. Haji Ibrahim Gabol	360
53. Sharif Gabol	150
54. Haji Khan Sobedar	60
55. Soomar Jokhio	125
56. Mir Khan Jokhio	120
57. Mohammed Talib	96
58. Baboo Dablo	50
59. Yaqoob Ahmed	72
60. Husain Ibrahim	120
61. Hamzo	90
62. Abdullah Dablo	72
63. Ishaq Dablo	90
64. Mohammed Dablo	120
65. Siddiq Karo	120
66. Qabool Dablo	210
67. Motoo Dablo	24
68. Yousuf	240
69. Ismail	60
70. Haji Mamoon	90
71. Bilal Dablo	90
72. Guli Dablo	150
73. Raza Mohammed Barj	72
74. Ghani Barj	90
75. Allah Bachayo Rano	120
76. Ahmed Samoon	108
77. Haji Abu Bakar Samoon	126
78. Kurmi Samoon	90
79. Mitho Gulri	120

80. Younus Gambhir	150
81. Syed Maqbool Shah	180
82. Mehar Shaikh	120
83. Anwer Barj	90
84. Abdullah Deeno	72
85. Ismail Lalani	90
86. Biloo Gulri	108
87. Mohammed Mallah	72
88. Abdullah Mallah	120
89. Abdul Razzaq Jat	130
90. Anwer Jat	90
91. Haji Mamoon Jat	96
92. Pir Abdullah Shah	72
93. Pir Haji Qasim Shah	108
94. Mohammed Ali Barj	120
95. Usman Gagoo	90
96. Dilawar Khan Sholani	96
97. Suleman Gagoo	90
98. Haji Alim Sholani	120
99. Haji Mamoon Poonbhar	90
100. Haji Moosa Katiar	90
101. Syed Ali Mohammed Shah	150
102. Ayub Khan Sholani	72

4.5.6 Intervention of Civil Society Organizations

Pakistan Fisherfolk Forum (PFF), one of the civil society organizations of Indus Delta and representative forum of fishing people living on the Pakistan coast stretched in 1050 kilometers of Sindh and Balochistan, and operating already in these disaster prone areas for

long has a number of units in the two districts of Sindh in particular. The PFF joined other civil society organizations, mobilized them and came in action during the Cyclone A-2 in 1999. It has experience and expertise in working on disaster, thus it started working in emergency as well as for rehabilitation of the affected communities of both the districts: Thatta and Badin in collaboration of such other civil society organizations. Lately, it has built some strong shelters in Thatta district for the fishermen and women, who live in disaster prone delta in straw huts.

According to the PFF survey, there is an urgent need to work for the rehabilitation of Indus Delta and its coastal communities whose source of livelihood is fishing. They have lost their boats, fishing nets, livestock, standing crops and homes in the devastating rains and flood. In fact boats and nets are the important for the livelihood of fisher people hence they should be provided such items for his family's survival. Those have lost standing crops in recent disaster should also be rehabilitated. Apart from this livestock holders should be reformed with the immediate support.

4.6 Tsunami

The origin of the word 'Tsunami' dates from the late 19th century. It is a combination of the Japanese words 'tsu' (harbor) and 'nami' (wave).

Generally, earthquakes measuring 7.5 or more on the Richter scale and having epicenters under the sea or in the coastal areas produce huge waves. Such earthquakes, in seismic lexicon, are known as "tsunamigenic earth-

quakes". And the waves generated in this way are known by the Japanese term "tsunami". This terminology has been adopted by all nations.

The oldest historical reference to a tsunami hitting the region dates back to 326 BC. Alexander the Great, while returning to Greece after his numerous conquests, wanted to travel by sea. He, along with his army, camped near the mouth of the Indus. Big ships were built to transport the army. Everything was ready, but sometime in November 326 BC a powerful earthquake occurred in the Arabian Sea, south of where Karachi is, producing huge waves. The tsunami destroyed the entire Macedonian fleet. And, Alexander was forced to return to Greece by the land route.

Makran coast is quite capable of producing earthquakes. This means that the area could be hit by a major earthquake and its by-product — the tsunami. To be sure, Makran coast is famous for generating tsunamigenic earthquakes.

There are several unconfirmed reports about subsequent tsunamigenic earthquakes in the vicinity of Makran coast. However, the most recent and well-documented one took place on Nov 28, 1945, which struck the area at 9.56am (GMT). The epicenter was about 125km from Pasni, in the Arabian Sea (24.2 N and 62.6 E). The quake's magnitude on the Richter scale was 8.25. The seismic event was preceded by several earthquakes, known as "foreshocks" in technical parlance. These were recorded in 1938 (two), 1940, 1941, 1942 (two) and 1943. The magnitudes of these events were in the range 5.5-6.25. The series of seismic events, in an indirect manner,

indicated the possibility of a big jolt.

The intensity of the 1945 earthquake was felt up to Dera Ismail Khan, Montgomery, Pishin and Mastung, all situated in the northeast of the epicenter. The displacement at the epicenter was about 15 miters.

The resulting tsunami caused extensive landslides on the seabed. The tsunami produced by the quake affected the entire Makran coast as well as the western coast of India. The height of the tsunami in the vicinity of Pasni was in the range of 12 to 15 meters.

Serious damage to life and property was witnessed in Ormara, about 200km from the epicenter. Karachi, situated at a distance of about 430km from the epicenter, saw a tsunami of about 1.5 meters.

However, when the tsunami hit the Karachi coast, it was low-tide time. Had the tsunami coincided with high tide, the story would have been very different.

Interestingly, two rocky, oval-shaped islets were thrown up by the earthquake about 280km from Karachi. These are about 5km apart and have a maximum height of ten meters above sea level.

Sixty years on, we have only a handful of research papers on the Makran coast tsunami. More importantly, we have no reliable estimates of the return period. As a result, one has to guess the return period.

Some guesstimates suggest that the return period for the destructive tsunami could be of the order of 75(+/-) 10 years. Keeping these figures in mind, we can safely say that the gestation period is already over, as we approach the return period. Information about these is extremely useful.

A receding sea represents the most reliable precursor. About 30 to 50 minutes before the arrival of the killer waves, the sea retreats. The distance to which the sea retreats could be in the range of half to two kilometers, depending on the oceanographic and bathymetric conditions. On Dec 26 last year, the sea had receded by about one kilometer along the coasts of Thailand, Malaysia, India and Sri Lanka.

The good thing about this precursor is that whether it is high tide or low, the sea recedes. Also, the precursor may even be observed in places far, far away from the epicenter. For instance, after the Indonesian quake in December last year, the sea receded by about two kilometers along the Mexican Pacific coast.

Another reliable precursor pertains to marine life. It is observed that just prior to a tsunami, the big fishes move to deep seas and the fishermen manage to net only a few. Instead, they generally get small fishes.

Records from some countries hit by the Asian tsunami indicate that on Dec 24 and 25, the fish catch was less than 30 per cent of the average figure.

An anecdote from the Asian tsunami is very instructive in this regard. On one of the Andaman Islands, people wanted to celebrate Christmas on the evening of Dec 25. A number of them gathered on a jetty with food and musical instruments.

At about 5pm some people saw a snake on the jetty. One hour later there were six to eight snakes there, but by 8.30pm the entire jetty was full of snakes, toads, crabs and other marine creatures.

Both the aforesaid precursors may be observed by common people. So, if you observe any sign of an impending tsunami, you should immediately inform the authorities so that mitigation measures are taken without delay.

There is yet another important finding from the December tsunami. It was found that the Sea Surface Temperature (SST) in an area of about 35km radius above the epicenter was greater than what it was in the surrounding areas. The rise was observed for about one week prior to the earthquake.

Initially, the increase was one or two degrees, but later it became more pronounced. A day before the seismic event, it was about five degrees Celsius above the normal SST. We can get correct SST figures with the help of meteorological satellites. Keeping a watch on SST could be particularly useful.

4.6.1 BOTANIC BARRIER

The most important factor vis-à-vis disaster mitigation is that the danger lasts for just a few minutes. There is no need for special protection. If people, for instance, observe that the sea is retreating, they should immediately run away from the beach.

The minimum safe distance is about one kilometer from the shore. The waves normally do not go beyond this distance, their energy being effectively dissipated. Constructing protective walls may be pointless.

The best option is to create a botanical shield. Planting of mangroves near the shore helps in reducing

the killer waves' impact greatly. The mangroves could be of the grass or bush type.

On the shore, Casuarinas trees may be planted. Other suitable trees include Phoenix Paludosa (date tree). These trees are known as sand-binders and are very strong as they don't break easily. Planting of a few rows of these trees will no doubt help tremendously in reducing the threat.

A tsunami hitting a port causes huge economic losses. The provision of suitable botanical protection, involving mangroves and appropriate trees, will greatly mitigate the disaster. Also, once a botanical barrier has been erected no further maintenance is required.

However creating awareness throughout our region about tsunamis is the best way to mitigate the disaster. After all, a tsunami on Makran coast will affect not just Pakistan but India, Iran and the Persian Gulf countries as well.

Many survivors of the Asian tsunami talked of the sea retreating dramatically, leaving fish flipping around in the sand, just before the first huge wave came smashing in. Although it does not precede every tsunami, such a retreat is common — a result of seawater plunging into the huge pit the earthquake creates in the ocean floor.

Sadly, the eerie spectacle of the vanishing sea is often a draw to those who witness it, instead of the alarm bell it should be. The next sign that a tsunami is coming is the wave rising high above normal sea level as it reaches shallower waters.

Even seismologists have trouble determining ex-

actly when a tsunami is about to be unleashed, though. While sensitive seismometers will pick up the vibrations caused by earthquakes, not every huge earthquake causes a tsunami.

Early warning systems are effective only when people get enough notice and know what to do. The Indian Ocean tsunami hit Sumatra too fast for any warning to be of use. Low-lying islands had little chance, lacking the high towers that countries such as Japan have built to provide temporary sanctuary.

5. CHRONOLOGY OF MAN-MADE DISASTERS IN INDUS DELTA

5.1 Diminished Flow of River Water Caused by Dams, Barrages etc

The ecological degradation of the Indus Delta began with the development of mega irrigation infrastructures on Indus River in pre-partition era by upper riparian that caused diminished flow of river water in the downstream of Indus River. With it, the frequency of disasters increased in this area, and the capacity of common folk to resist onslaught of the disasters also became enfeebled with drastic loss of livelihood caused by the calamities one after other.

In 1890s, the irrigation system of Punjab was developed under Birtish Raj, followed by the development of Sukkur Barrage in 1932, construction of Kotri Barrage in 1955 and the Guddu Barrage in 1962. Subsequently, two huge dams were constructed on the Indus system, the Mangla and Tarbela dams in 1967 and 1974, respectively. There are, now, 19 barrages and 43 canal

systems with 48 off-takes on the Indus River System in Pakistan, creating world's largest contiguous man made system of 61,000 km of canals and 105,000 water courses, irrigating 35 million acres of land. Three storage reservoirs Mangla on River Jehlum and Tarbela and Chashma on River Indus were built, with total storage capacity of 20 MAF. Additionally, 12 link canals were constructed to transfer water from western rivers to eastern rivers or the tributaries of the River Indus, in Punjab. The estimated available flow from the river Indus is about 150 MAF per year. As a result of these interventions, the Indus River freshwater discharge in the deltaic region has been reduced to one-fifth of its natural flow and the river has been confined to a single channel almost down to coastal area.

The average flows to the Indus Delta from 1931 to 1947 generally exceeded 73 million-acre-feet [MAF] and the suspended load averaged 225 million tons [mt], While from 1991 to 2003 discharge came down to 35 MAF and the sediment to 36 mt. The most critical years were 1999 to 2002 when downstream Kotri flows were substantially reduced to a greater extent. The flows downstream Kotri Barrage were recorded as 8.84 MAF in 1999, which further reduced to 0.74 MAF in 2000. The flows in the year 2001 were recorded as 1.92 MAF and in 2002, the flows downstream Kotri Barrage also remained as reduced as 2.15 MAF. The above flows are likely to further reduce in future. A review of the Indus River System operation from 1976-1986 shows that of the 146.39 MAF available on average from the inflows to the Indus, 104.63 MAF were withdrawn in the various canals, and on average

34.83MAF were released below Kotri each year. About 40% of the water withdrawn for irrigation is lost due to evaporation and seepage due to inefficiencies in the canal system.

In March 16, 1991 Sindh and Punjab, besides two other provinces, reached on an accord over the water resources distribution. Here is the summary of water allocation / apportionment to the province under the accord: Punjab and Sindh were apportioned 37% - 37% while NWFP and Balochistan were appointed 14% - 14% as a balance flows from the river during flood and in future storage schemes. The need of water discharge was recognized and an 'optimum' level of 10 MAF was decided till the formal study could be conducted for the exact requirment. The conduct of studies regarding determining the minimum downstream Kotri water discharge was decided. It was also decided that the system-wise allocation would be worked out on a 10-day basis and the record of actual average system uses for the period 1977-82 would form the guideline for developing a future regulation pattern. The average flows released below Kotri before water accord of 91 has been 34.83 MAF of which some 20 MAF actually reach the mangroves, while the optimum being suggested in the accord is 10 MAF.

Almost all mega-irrigation constructions, except Sukkur and Kotri Barrages, mostly fulfill the irrigation requirements of Punjab. These construction activities were accomplished largely without the consent of Sindh – a violation of the agreements between Sindh and Punjab. Most of the land that was brought under cultivation due to

the barrages in Sindh was also allocated to the Punjab-based military officers, bureaucrats and the settlers, either in the reward of their official services or to curtail down demographic pressure from Punjab. Since the Water Accord 1991, Sindh has never received its fair share of Indus water, the study for outflow to the sea has not been performed, and the water outflow to sea has never been as allocated.

Under WAPDA Vision-2025, Pakistan has planned numerous projects and approved them for construction without appropriate consultation or consent of Sindh as required under the agreements between Sindh and Punjab. These projects include Kalabagh dam, Basha dam, Sukurdu dam, Satpara dam, Dhok Pathan dam, Sanjwal dam, Akhori dam, Bhater dam, Rohtas dam, Yugo dam, Chiniot reservoir, Hingol dam, Naulang dam, Gajnai dam, Mol and Khadeji dam, Rohtas dam, Mirani dam, Sabakzai dam, Gomal Zam dam, Kalam dam, Kachhi canal, Chashma right bank canal, greater Thal canal, Rainee canal, Sehwan barrage, etc. So far as, the technical side of the matter is concerned, the total availability of water is not enough in the system to meet the requirement of these projects on the Indus River System or they only can be regulated on the cost of further reduction in the share of Sindh. There is a great resentment in Sindh on the question of water shortage. During July, August and September 2002, a total 167 protests were reported by the newspapers out of which 29 were held in the command area in the downstream of the last barrage on Indus in southern Sindh known as Ghulam Mohammad Barrage, but commonly called Kotri Barrage.

5.2 NATIONAL DRAINAGE PROGRAM (NDP)

The federal authorities in Pakistan introduced a National Drainage Program (NDP) aimed at draining out water-logging, salinity, agricultural effluents including pesticides etc, and the toxic waste by the industries besides other saline water from north to south into the sea through Left Bank Outfall Drain (LBOD) and Right Bank Outfall Drain (RBOD) constructed on the left and right bank of river Indus.

Figure 2: Indus Basin Irrigation System and Surface Storage.

The original PC-1 for National Drainage Program (NDP)5 aimed at evacuation of all saline drainable surpluses from Indus Basin to the Arabian Sea had an approved cost of Rs.31.4 billion. The project commenced in July 1997 with scheduled completion in six and half years, i.e. by December 2004. It has three components; the one aims at improving drainage and water management infrastructure in about 5 million hectares including the Left Bank Outfall drainage project (LBOD) remaining works. Finally, all effluents generated at upstream of the Indus Basin will be transported through the network of surface

drains called National Surface Drainage System (NSDS) and connected with existing LBOD fall point in left side of Indus and RBOD on right side of Indus in order to dispose of into sea.

Harm Caused By NDP

Besides the implementation of NDP as envisaged in Staff Appraisal Report (SAR), significant losses have already occurred due to LBOD especially its components of tidal link,

5.2.1 Left Bank Outfall Drain (LBOD)

The drainage fluids of 1.27 million acres of irrigated land in Nawabshah, Sanghar, Mirpurkhas and Badin districts flow into the Left Bank Outfall Drain [LBOD] to the sea at

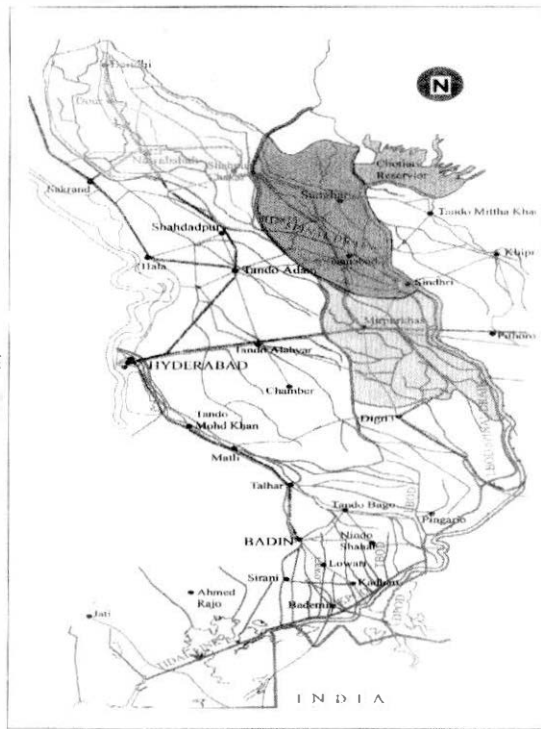
the delta. This forty-two kilometres (42 km) long drain collects excess irrigation water, saline seepage, pumped saline

grounKarachi Westater, rainfall runoff, and industrial and municipal wastewater. This drainage system has affected the biodiversity; especially various fish species of the deltaic waters are distincting. Meanwhile, due to faulty design it affects adversely the irrigated lands. Presently, it disposes off more than 2,500 cusecs daily. It was during the construction of the Tidal Link and its Cholri Weir that the local communities of Badin district, from where the Tidal Link passes, objected to the design of the link project, terming it disastrous for the fertile land and environment of the area. But, implementing authorities ignored the inhabitants concerns and viewpoint. In 1995, the year of project finalizing, floods washed its banks away resulting in inundation of the fertile land with the drainage effluent. No sooner than on 24th June 1998 LBOD received a major setback, when a portion of Cholri Weir of the Tidal Link [400 feet portion out of total 1800 feet] was wave-washed by the sea tide, posing a severe threat to the fertility of agriculture land in the area. Besides, it could also not sustain the cyclone, which hit the coastal areas of Badin and Thatta on 20th May 1999. About 56 breaches occurred in the embankments of both the sides of the link drain, as about 60 feet wide embankments of LBOD were washed away at various places.

In Badin the fresh water ponds and lakes, which were the major source of drinking water for the villagers have been converted into saline water bodies. As a result of reduced fresh water flow from the Indus River and drainage back flush and floods the water quality in surrounding have also become saline. Consequently, the villagers are unable to use even groundwater for drinking purposes.

The poisonous water comprising toxic waste of

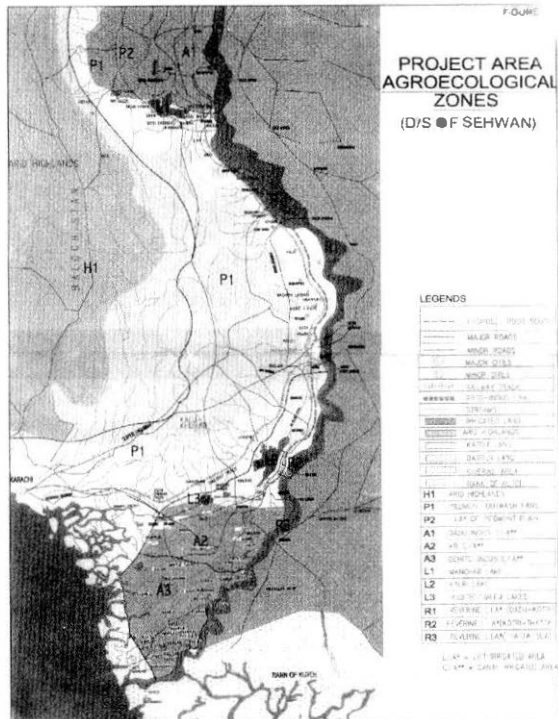
pesticides, tanneries and sewerage of cities etc being drained out in the sea comes to the Indus Delta first and harms the biodiversity of delta besides creating ecological disaster in the tail end of the river. Presently, more than 2,500 cusecs of LBOD effluents comprising poisonous pesticide residues are disposed of in the Indus Delta daily.

The technical faults in the designs of the LBOD tidal link resulted in negative impact of the project on fertile deltaic lands of district Badin. The 42 km long Tidal Link was constructed to drain out saline water of the agricultural lands of the north to the Arabian Sea in the south. It was during the construction of Tidal Link and its Cholri Weir that the local communities of Badin district objected to the design of the project terming it disastrous for the fertile agricultural lands and natural environment of the area.

LBOD Area Map

As soon as the Tidal Link was completed in 1995,

the floods washed away its banks resulting in flooding of fertile agricultural lands with poisonous water containing toxic waste and hazardous effluents. The project again got serious jolt on 24th June 1998, when a portion of Cholri Weir (400 feet) was dismantled by the tidal wave of the sea. The unsustainable banks of the Tidal Link could not sustain the onslaught of a cyclone on 20th May 1999 during which about 56 breaches occurred in the embankments on both sides of the drain spoiling a vast fertile area.

5.2.2 Right Bank Outfall Drain (RBOD)

So was the case of the Right Bank Outfall Drain (RBOD) aimed at draining out agricultural effluents and saline water from the right bank of Indus River to the sea. The project visualized to collect saline water from agricultural estates of Southern Punjab, Northern Sindh and Balochistan and drain it out through various disposal drains into the sea to combat the twin-menace of

water-logging and salinity from right bank of Indus. B u t , instead of reducing pollution of water logging and salinity, the RBOD polluted Manchhar, which is the biggest natural sweet water lake of South Asia, as well as Hamal Lake, which is spread in 30 miles, and is the second biggest natural sweet water lake of Sindh after Manchhar. The RBOD brought poisonous water to both these sweet water lakes through MNVD (Main Nara Valley Drain), which in fact was the old Western Nara, the natural inundation canal of Indus that used to fill Hamal and Manchhar with water of Indus in case there were no rains on western mountains of Sindh.

So, the biggest blunder made by the managers of RBOD was to convert the sweet-water MNVD into dirty water drain. And since it was remodeled and connected with Hamal and Manchhar in 1976, so it destroyed both the lakes altogether.

The dilemma of design fault hit this project too like the LBOD. First of all, it was designed to dispose of effluents through Manchhar Lake, but the route of the drain was changed after hue and cry by the civil society and the concerned people hit by pollution. Then the disposal route was planned through Indus at Sehwan; but that too was altered after mass-protests by the people.

It was apprehended by the civil society organizations that the disposal of effluents containing salinity level of 2,000 to 3,000 PPM would degrade the Indus River downstream of Sehwan, and threaten not only millions of agricultural lands in command area of Kotri Barrage but also the health of the people of Karachi, Hyderabad, Thatta, Badin and Kotri etc.

Now lately, the route of RBOD effluents' disposal has been diverted directly to Gharo creek in Indus Delta en route the sea. For that purpose, the drainage infrastructure is being constructed from Manchhar Lake to the Gharo creek. This would further degrade the biodiversity of the Indus delta including its natural livelihood resources of mangroves and fisheries, and is feared to be the last straw on the camel's back.

RBOD project has developed at this stage through various development backgrounds that includes the construction of the Main Nara Valley Drain [MNVD] in the early 1960s at western side that was remodeled and linked with Manchar Lake in 1976. The disposal of drainage through MNV Drainage completely degraded Manchar Lake, resulting in decrease in fisheries and agriculture resources of the lake and consequent poverty and migration from the area. This resulted in mass protest by the civil society organizations. In response to such protests, at first a project was prepared to drain off MNV drainage effluent into the Indus River near Sehwan. This again faced the opposition of the civil society organisation. It was feared that drainage effluent of the salinity levels of 2,000 to 3,000 PPM and would completely degrade the Indus River downstream of Sehwan and Kotri Barrage deteriorating irrigating and drinking water reservoirs and consequently give birth to crises in deltaic areas and two thickly populated cities of Karachi and Hyderabad.

5.3.3 Ghora Bari Outfall Drain (GBOD)

A team of students from Environment Engineering Department of Mehran University, Jamshoro, Sindh, stud-

ied the GODS in 2002. The drain systems occupy 209127 acres. The study shows that all the soils are calcareous without secondary lime concretion; the content of lime varies from 7.0 to 14.0% the pH value ranges from 7.4 to 8.5. The contents of organic matter vary from 0.1 to 1.58 % while that of available phosphorus is very low. In Ghora Bari Drainage System soils are 37.4% moderately fine, 24.1 % medium, 18.6% moderately coarse and 0.3% coarse. The remaining 19.6% comprises built-up land 9.7%, hills 4.7 % and dhands / fish ponds 5.2%.

The people in the area drink water available in irrigation channels, the saline water available at Ghorabari Drain and wetlands like Jamdari, Sumra and Lakhro, where irrigation channels are not available. Underground water resources are used where on ground water is unavailable. The quality of ground water does not satisfy the WHO International Standard.

6. DISASTER VULNERABILITY OF INDUS DELTA

6.1 COASTS, COASTLINES & COASTAL ECOSYSTEMS

Coasts are the preferred habitat for the world's inhabitants – claiming over 50% of the world's population and 12 of its 15 largest cities. The coast is abundant in natural resource riches that are important both economically and environmentally. The coast is also a place of extremes – attracting both the wealthiest and the poorest of the poor. These realities present many challenges. How to create a vision for and then manage these important coastal places in a way that is equitable, which balances economic and environmental needs, provides a quality of life that can be sustained over the long term?

6.1.1 COASTAL HAZARDS:

Coastlines are naturally dynamic – shaped and re-shaped by such dramatic events as hurricanes, typhoons, tsunamis, earthquakes, and severe storms and the often

more gradual processes of accretion and erosion. Human activity affects the global climate, in turn leading to sea level rise and changes in long established seasonal temperature and rainfall patterns. The combination of Natural and Human forces present major challenges to coastal managers.

6.1.2 COASTAL HABITATS:

Coastal ecosystems by unit area are far more productive than terrestrial or marine ecosystems. Central to this productivity – and the many associated services they provide to humanity – are the estuaries, coastal wetlands, sea-grass beds and coral reefs. These can be termed 'critical' coastal habitats. Large portions of these important elements of coastal ecosystems were destroyed or degraded in the past century and the downward trend continues unabated in many regions. For coastal managers, the conservation and rehabilitation of what remains is a top priority.

6.1.3 FISHERIES:

Fisheries provide the world with important revenue and a critical source of animal protein – both of which are particularly important to the poorer segments of coastal societies. In the past, the world's oceans were believed to offer an unlimited supply of seafood. We now know the reality is otherwise. Too many people harvesting a rapidly diminishing supply of living aquatic resources while using increasingly efficient harvest technologies create a serious food security problem in many countries.

6.1.4 TOURISM:

Tourism has become the world's biggest industry and the majority of the tourist destinations and tourism infrastructure are coastal areas. Coastal tourism employs millions of people worldwide in recreation, fishing, snorkeling, scuba diving, and other aquatic activities. Coastal visitors frequent tourism complexes and resorts, marine recreational facilities, entertainment facilities, shore-side recreational facilities, parks and protected areas. They also visit non-beach shorelines, reefs, estuaries, back-bays, salt ponds, lagoons, coastal plains, and offshore waters. In spite of the positive aspects of COASTAL TOURISM – the revenues and recreation it provides – unbridled tourism development often creates serious problems, especially in developing countries. According to The World Tourism Organization (TWTO), developing countries need help 'to create an appropriate regulatory framework, efficient planning, sound management and clear sustainable development guidelines.' When these measures are in place, tourism has proven to provide a strong economic base on which community development and environmental protection is fostered.

6.1.5 URBAN COASTS:

Much of the world's population that lives within 200km of the coast is concentrated in a few large urban regions and many smaller coastal cities. These people and the economic activity they generate provide vital income for their nations. They also create pressing demands; demands for building-land often lead to filling in of critical wetlands. Demands for fresh water, energy, waste dis-

posal, and protection from coastal forces such as erosion and flooding stretch the limits of municipal resources. The need for port and commercial facilities adds yet another pressure – leading to modifications of shorelines and embankments including dredged channels and armored, stabilized shorelines. Learning from past mistakes, many cities are now turning to their degraded waterfronts as a prime locus for revitalization and mixed commercial and residential development, access and recreation and are practicing alternatives to armoring their shorelines. Such planning can and should be part of a larger coastal management and development strategy.

6.1.6 FRESH WATER FLOW TO COASTAL ECOSYSTEMS:

The quality and supply of fresh water to coastal ecosystems and the effects of land based sources of pollution on both human uses, estuaries and the ecological functioning of near-shore waters are vital concerns of coastal managers. Reducing the quantity or availability of fresh water or creating contaminated flow of water into coastal ecosystems produces benefits for a few sectors or users at the expense of many others. Solving quality and supply issues requires integrated approaches that may involve difficult societal trade-offs and complex negotiations among competing groups. In addition to creating the institutional capacity to deal with water problems, coastal managers need to assemble good scientific data and arguments that can give full weight to the marine and coastal needs for the appropriately timed flow of clean water to sustain fisheries, ecosystem functions and human uses.

7. IMPACT ON INDUS DELTA

7.1 Sea Intrusion

Red rice, a prized crop, cultivated into the active delta near Kharo Chhan, has abandoned due to lack of fresh water in the distributories of Indus. While, orchards of banana, papaya and guava the crops of high market value once farmed the west to the Kharo Chhan region are almost non existent. The reason lies in the sea intrusion due to reduction in downstream Kotri water discharge.

Land Degradation Details Due to Seawater Intrusion Thatta & Badin Districts								
Sr. No	Talukas	No. of Dehs	Areas of Talukas In Acres	Affected Area				
				Dehs Totally Eroded by Sea	Area in Acres	Dehs Partially Affected	Area in Acres	Total Affected
1	2	3	4	5[a]	5[b]	5[c]	5[d]	5[e]
District Thatta								
1	Shah Bandar	92	729382-0	12	504553-24	31	85884-18	590443-2

2	Ghora-bari	59	231980-0	2	7316-25	8	24174-0	31490-25
3	Kharochhan	41	252110-0	21	95910-0	9	2193-0	117823-0
4	M. Sakro	90	736541-0	3	11033-25	17	49140-13	60178-0
5	Jati	132	8753760	1	194556-0	10	274569-0	226663-0
6	Keti Bandar	42	150594-0	28	112959-0	1	1000-0	113959-0
	Total	*456*	*2975893*	*67*	*414464-33*	*76*	*456680-31*	*1140556*
				District Badin				
1	Golarchi	102	440504-0	1	6772-0	5	23853-0	30625-0
2	Badin	140	352681	4	28986-7	6	20193	49179-7
	Total	*242*	*793185*	*5*	*35758-7*	*11*	*44046*	*79804-7*
	G. Total	**693**	**3769078**	**72**	**450223-03**	**87**	**500726-31**	**1220360**

Source: Board of Revenue, Government of Sindh

Reduction in downstream water discharge has allowed sea to overcome the coastal plains and reduced cover of mangroves, which further has accelerated the process by allowing erosion and high tide occupation of coastal plains. Consequently, a large fertile area of district Thatta and Badin is now under seawater. The seawater intrusion can be categorised as: a) The land absolutely occupies by sea b) The land converted into mud and frequently receive seawater during high tide. Besides, the sub-soil salinity has touched the upper fertile part of deltaic districts. The growers from Jheruk, near Kotri have reported the extremely brackish water extracted through tube wells.

As a result of sea water intrusion, about 1,220,360

[1.22 million] acres of land in Thatta and Badin have been badly degraded mentions a survey report, carried out by the Irrigation Department and Board of Revenue Sindh some two years ago. Six Talukas of district Thatta Shah Bunder, Ketti Bunder, Ghorabari, Kharochaan, Mirpur Sakro and Jaati are the major victims of such a situation with the land loss of 50 to 70 percent. But the number of degraded land has shoot up to 2.2 million acres in last two years some recent reports say [Daily Dawn, ----]. Taluka Keti Bunder of Thatta comprised on 43 dehs with an area of 144,083 acres, out of these 28 dehs have submerged into sea over the last 40 years, while 14 dehs have been damaged partially. These submerged dehs were cultivated with red rice, which was a cash crop, today the rice growing has shrunk to just 54 acres. Keti Bunder has become a virtual island, surrounded by seawater. To prevent seawater intrusion in the town, a protected wall has been developed around it. Taluka Kharo Chan comprised 42 dehs with a total area of 235,485 acres. However, sea intrusion has devastated the area by inundating 20,426 acres of land, thereby rendering it unfit for cultivation or any other uses. The figures, based on the statistics provided by the office of Mukhtiarkar of Kharo Chan and District Revenue office, Thatta, show that 86% of land in Taluka Kharo Chan has surrendered to the encroachment of the sea over the past 40-50 years. Similarly, Ghora Bari tahsil includes a total 61 dehs over an area of 231,980 acres. Of these 61 dehs, 14 dehs have been damaged by the sea. This has resulted in a land loss of 38,587 acres, which comes to 34% of the total area. Golarchi and Badin coastal talukas of district Badin have been badly affected also. In total, 159

dehs of eight tahsils, spread over 1.22 million acres of land, have either been totally eroded or subsequently submerged by the sea. The district is also victim of desertification.

7. 2 Damage To Mangroves Eco-system

When fresh river water and salt water of the sea mingles near coastal area, the mangrove forests develop in the brackish water. They are balancing element of deltaic / coastal ecology, and work as hatchery of fisheries, nursery for local and migratory birds and source of livelihood for local communities in the form of grazing pastures, fuel and timber wood and many other indirect productions. It also resist landward sea tendency and hinder tsunami and cyclone waves.

Due to absence of water discharges in the downstream of Kotri Barrage towards Indus Delta, the mangrove forests are being exterminated. Today, Aegiceras cornisulatum has almost been exterminated from the Sindh Coast except few small stands in Dabo creek and Pakhar creek near Shah Bunder.

Avicennia marina is the major mangrove specie occupying about 99.9% of the forest area. Dense Mangrove forests are found either in narrow stretches in blocks of more or less rectangular form along creeks, carrying profuse growth of Avicennia marina locally known as *timer*, which grows abundantly on muddy shattered shores and subjected to periodic inundation daily due to tidal action of seawater.

Besides the Avicennia, the only other species

found are Ceriops tagal and Ageciras corniculatum. These occur mostly in Khai, Dabo and Pakhar creeks. Maximum salt tolerance of these species is 60 ppt but adaptability to ground conditions are limited. The trunk of Ceriops is single, straight and solid and the leaves are not browsed. Dense mangroves are present in Korangi, Phitti, Khudi, Khai, Patiani, Dabo and Sisa creeks of northern area and Kajhar, Pakhar and Seer Creek of southern area. Medium level mangroves are widely scattered in the Indus Delta, forming about 35% of the total vegetation.

Recent data reveals the mangrove cover has reduced to 73,001 ha [Forever Indus, 2004, WWF] in 2000 from about 228,812 ha in 1985 [Qureshi, 1985]. The situation has left adverse effects on fisheries resource, as mangroves are the natural hatcheries of fisheries resources. Such a process has caused reduction in livestock and livestock-oriented products such as hides, milk, butter etc that have both use as well as market value for the livelihood of local communities.

This ecological catastrophe may cause frequent cyclones as Sindh coast, which comes in the proximity of tsunami waves in the Indian Ocean. Mangroves also play a role of resistance to such waves operating as botanic barrier. Due to removal of mangrove cover, the edges of earth are exposed and become vulnerable to erosion, which in due course of time results in submerged soft mud flats causing problems in fishing and easy rowing of boats. The major reasons behind this phenomenon are:

Increase in salinity level, reduction in sediments and nutrients come along fresh water and land ward inclination of sea mainly due to drastic shortage in down

stream Kotri water discharge towards Arabian Sea.

Population pressure and commercial use pollution.

The coastal inhabitants are mostly fishermen, professional grazers and agrarians, a population depending on fishing, agriculture, livestock and small trading. It turns toward mangrove forests, when Indus is in floods during monsoon and sweeps over the cultivatable lands. In this period pressure comes on mangrove timber and fuel wood. The mangrove wood is also used when fishermen temporary migrate to the isolate islands in the peak fishing season. Besides, fishermen also require fishing pole of Avicennia of about 3 m long to hold the fishing nets in small creeks. This demand for poles has now decreases with the introduction of fishing trawlers and boats fitted with marine diesel engines.

On the other hand professional grazers own large number of camels, which graze on coastal lands mainly during the flood season. They come from the interior of Sindh. These camels have adjusted themselves to live on the coastal islands surrounded by the creeks and can even swim and stand in knee-deep water during high tide. Usually camping sites are more or less the same each year. When the flood season is over, the camels are taken back to the interior area. However, some camel owners keep some limited stock in suitable places in the mangroves all year round for breeding purposes. This trend has now changed due to reduction in the frequency of Indus River floods. Local villagers of the coast also graze their cattle in easily accessible places. Avicennia leaves are their feed.

The population of coastal villages uses the mangroves extensively. Mangroves are traditionally used as construction wood, livestock fodder and a fuel source. The lowest strata of poor community use Avicennia marina for the construction. The most pervasive use of mangrove wood is in the form of fuel-wood. Mangroves provide a cheap and accessible source. The fuel use pressure has reduced in the areas, where fuel gas has been networked. The major products of mangrove forests include firewood, timber, timber poles and charcoal.

Each household uses about 180kg of Avicennia wood per month and about 17 percent of household use mangrove wood as fuel on regular bases. Timber used in terms of quantity amounts to 1600 tons per year. The minor products obtained from mangroves include fodder, honey and tannin. Avicennia marina provides a good amount of foliage and is intensively used as fodder for cattle. When the bigger trees are not accessible to the animals, the common practice is to pluck the leaves] from the forest and transport the through small country boats.

The mangroves in the past were not so degraded, deformed and depleted, as they appear to be today. The present condition occurred due to changes in resource use patterns and development activities. When some two hundred years ago Indus entered the sea at Shah Bandar, there existed highly dense mangrove forests with optimum growth and density. The wood from these forests were abundantly used as fuel by all incoming and outgoing steamers on their long trading route connecting Middle East countries with Asia. No commercial exploitation of mangrove is going on in Pakistan at present as such be-

cause nearly all mangrove forests are either too degraded or have been converted to saltpans, ports and harbors or to other uses.

A few years ago, the Board of Revenue, Government of Sindh, allotted an area of 6,070 ha to the Fisheries Department for shrimp farming in Mirpur Sakro subdivision. The later allotted 3,794 ha of the land to 83 parties including Lipton Ltd. for developing private shrimp farms. The de facto possession was only 1,060 ha, because much of the allotted area was now under seawater. Only Fisheries department and Lipton Ltd. initiated shrimp farming that encountered a failure.

Dolphins, jackals and birds are the prized wildlife of the mangrove ecosystem. The oil of dolphin and pelican, a migratory bird, fetches high price. These animals are becoming rare in the area. The habitat also provides nesting ground for a large variety of migratory birds, which provide hunting and recreation to the public. There were "eight different species of mangrove in the Indus Delta through the 1950s. However at present, only three species of mangrove exist in the Delta, with Avicennia marina accounting for about 95 percent of the mangroves. The other two species, Ceriops tagal and Aegiceros corniculatum, are restricted to localized patches, which indicate ecological stress.

7.3 LOSS TO AGRICULTURE

The impacts of water shortage in Indus on the surface water aquifer are dangerous for humans, agriculture and flora and fauna. Situated at about 200 Km from the

Arabian Sea, Kotri Barrage is the source of water flow for agricultural purposes as well as of drinking water for Hyderabad and Karachi cities and deltaic riverine and irrigated area. The water quality in the region depends upon the water flow down the Kotri barrage and back flow of seawater along river Indus. So far 2.2 million acres of fertile agricultural lands have been spoiled by oceanic encroachments on the surface and underground seepage. Thus the garden areas of Indus Delta have been converted into marshes spreading devastation far and wide.

A scientists' team from Sindh University, Jamshoro, comprising on Prf. Dr. M. Y. Khuhawar and others undertook the water quality study in the downstream of Kotri Barrage area. The work reports the variation in the water quality from 1997 to 2003. During the study the flora was also observed completely of marine origin. "The Indus downstream Kotri Barrage up to Sujawal Bridge with reduced water discharge had converted into water pools with high salt contents, with growth of aquatic submerged plants of brackish water. The fresh water fish had also decreased due to high salinity.

It indicated that fertile agriculture land on the bank of the Indus near village Sunda had changed into barren land with salt contents 10 to 20 times higher than the riverbank bed due to the use of Indus water with high salt contents. The backflow of seawater along with river is also affecting underground water in the Delta region. The fishing village along the left bank was using underground water with Total Dissolved Solids [TDS] up to 4,300 PPM. The maximum permissible limit for human con-

sumption by W.H.O. is 1500 PPM."

In past, people in the deltaic region would grow a variety of crops after the recession of floods in the Kharif season. Areas enclosed between the banks of the river would get enough recharge to support such cropping. Silt brought through the high floods would settle in the vast catchments and provide a fertile blanket for Rabi cropping and developed pasturcland to support a livestock population, a vital source of livelihood for the local population. 'Forest production was also attributed to high floods.

Red Rice was the main crop, and most of it was exported to the coastal regions of India and the Gulf. The harbors of Keti Bunder and Shah Bunder were full of boats from Dawarka, Gumti, Muscat, and the Persian Gulf ports. Populations of these delta ports were well over 15,000.' [Arif Hassan, 1993] The reduction in fresh water flow has caused many ecological changes that provide a consequence to sea intrusion. Agriculture in the region has been badly affected due to both reductions in fresh water and intrusion of seawater.

7.3.1 Livestock

Details provided by Provincial Directorate of Animal Husbandry shows that 38% of cattle, 45% of buffla-oes, 40% of sheep, 37% of goats, 40% of camels, 57% of horses, 35% of donkeys' population were reduced during the year 1991 to 2000. Keti Bandar was once a popular city in Sindh for its butter export and milk made sweets production. This was due to large number of livestock resources in the area. Thatta and Badin were considered as

the best grazing grounds for cattle due to their fertile land, green pastures and mangrove forests. The mangrove leaves were used for cattle, buffalo, and donkey fodder. Today, the local communities have started losing their livestock livelihood resource. In all the coastal Talukas of district Thatta through depletion and erosion of ranges, shortage of fodder green grasses, shortage of drinking water, migration, and sale for the purchase of boats.

7.4 Reduction in Fisheries Resources

According to a survey by the Pakistan Fisherfolk Forum (PFF), the reduction of fish-catch in Indus Delta has been at least 70 percent during past a few decades. The income of $1 00million per annum from shrimp export has been drastically reduced. The shrimp is produced mainly in Indus Delta, where it is fed on roots of mangroves.

The fishermen at Korangi, Khudi, Hajamro and Turshan Creek island villages reported the severe reduction in fish resources of the coastal area. The elderly fisherman remembers the golden past when Indus was in blooms and they were able to have a finer catch in shorter time. Palla, says eighty six year old Abdullah Mallah of Kharo Chhan, was their target of catch and they usually got it in abundance. Since last a few years, it has become almost unavailable specie. So is the case with Mangar, Dangri, Paplet and other fish in the delta, according to fishermen of nearby islands. As the average during the period of the last ten years, the valuable Jaira shrimp catch declined roughly by 47% and the Kalri shrimp catch by 18%. Similarly, annual [actually 10 months, excluding

June and July] per trawler shrimp landings at Karachi have also declined from 15 metric tones in 1971 to just 2.12 metric tones at present. The overall fin fish and shell fish catch from the Sindh Coast was 348,689 metric tones in 1993, which has reduced to the level of only 64,400 metric tones in 2000. The decrease in the production of marine fishery resources, despite the increase in fishing boats and time consumed per fishing trip speaks volumes about the drastic decline in fisheries resources.

7.4.1 Unsustainable Exploitation in Fishing

Traditional ethics of fishing and taboos had restrictions in certain time for fishing. Today, they are been disregarded as the fishing is resorted to for 24 hours, which has resulted in the depletion of the fish resources. The entry of non-fishermen population into fisheries or immigrants with the motive of high earning have cased end to this traditional attitude towards resources. Today, the majority of indigenous fishermen have also become involved in unsustainable methods of fishing. Some of such unsustainable methods of fishing include fishing for longer hours, fishing everywhere, even not refraining from fishing the areas considered as breeding grounds for juvenile fish and using harmful nets. The entry of non-indigenous people, especially of those with clear high profit making motives, has resulted in the development of Boolo Gujo and Katra - new and very harmful fishing nets. These destructive nets are used in the creeks as well as in the mangrove forest areas, which are the breeding grounds for the juvenile fish. Use of such nets results in the genocide of the fish and shrimps. The Sindh Government, under a no-

tification issued in 1995, had banned the use of Boolo Gujo and other destructive nets. However, due to lack of proper implementation of the law, such deadly nets are still being widely used.

In 1996, Pakistan extended its jurisdiction up to 200 nautical miles in the sea, after the declaration of the Exclusive Economic Zone [EEZ]. Since then this zone is being exploited through foreign fleets and joint-venture industrial fishing trawlers. These deep-sea trawlers have also been engaged in over-fishing. Being fully mechanized and computerized, these deep-sea trawlers continue fishing unabated, and in this process catch millions of tons of fish with their lengthy trawl nets.

7.5 Impact on Deltaic Communities

7.5.1 Poverty

The degradation of livelihood resources has culminated in the serve poverty of the deltaic communities. According to Asian Development Bank's figures 100 percent of livestock keepers, 67 small farmers, 63 percent of wage labourer, 49 percent of fisher folks fall in the bellow the food poverty line. In toto, 56 percent population of district Thatta lives below the food poverty line. The situation in Badin also is not much different.

In the islands and extreme deltaic areas in Kharo Chhan and Keti Bandar drinking water sacristy is the most severe problem of the people. Fishermen use to carry *Horhi*-small boat almost every alternate day to the nearby towns purchasing water. A tanker is sold at prices ranging from Rs 700 to 1,200. But the poor people have neither

space for the storage for such a tanker nor they can purchase this at such a higher price.

Poverty has left adverse effects on almost all aspects of social institution of coastal area that has become fragile with high scale resource degradation. This can effects can be judged through very much common traditions and rituals. *Otaq*, traditional villages centre and marriage, a jubilant event for the families, has almost lost their cultural properties. Uncertainty of livelihood resources and insecurity of future has caused depressions and anxiety in the deltaic communities. Suicide has become very much evident in the coastal districts of Sindh.

The major cases come to the hospitals, according to the doctors, due to impure drinking water. Main victim becomes children and women. The lack of medical relief further deteriorates the general health situation. The contaminated drinking water is the major cause. Natural organic matter reacts with chlorine, used in water treatment plants for disinfection, to form trihalomethanes [THMs]. Epidemiological studies have conclusively shown increased risks of cancers of the colon, rectum and bladder, associated with drinking-water, containing high levels for THMs [greater than 30 micrograms/litre]. Nitrate-nitrogen level is greater than 10mg/l in drinking water cause, what is referred to as infant methemoglobinemia, or, "blue baby" syndrome.

The common diseases include Acute Respiratory Tract Infection, Malaria, Typhoid, Tuberculosis, Hepatitis A & B, Measles, Mumps, Acute Flaccid Paralysis, Neo-Natal Titanus, Intestinal Helminthes, Urinary Tract Infections, Pelvic inflammatory disease, Skin diseases like Sca-

bies, Allergic, Eczema, Amenia, Malnutrition, Renal diseases, Cydes, Sub-muscosal fibrosis [oral], Oral Cancer, Anxiety Neurosis, Snake bites and Dog bites.

7.5.2 Migration

The worst humanitarian crises as a consequence of the degradation of Indus delta has come in the form of mass migrations. Once flourishing villages have become shelter to some scores of households; the flow of the migration has been towards urban areas like Karachi, Hyderabad, Badin and Thatta cities.

A large number of people have migrated from the coastal areas. More than 12000 people inhabited Kharo Chhan Island. Today, the island is resided by nearly 5000 people; rest of the population has migrated to the different urban centres of the lower Sindh. So is with the coastal villages of Badin and Golarchi talukas. In 1999 at least 300 houses were in the village Keerio Bhanderi, taluka Badin, today hardly a 100 homes are remaining there. While, eight to ten villages of the fishermen and 10 villages of the Jat community have migrated from Shaikhani Ghari. According to estimates so far, at least 40 to 50 villages have migrated from 18 dehs of just Taluka Badin. Thirty, out of 200 households from village Bahadur Khan have migrated. The mass migration has taken place from Shakoor lake area that include the Rafiqu Mehran Poto, Sideeque Mehranpoto, Mohammed Raheem Boohar, Pir Dino Malah and many other villages. Likewise, hundreds of villages have been completely uprooted from the coastal tahsils of Ketti Bunder and Kharo Chan with the passage of time. During the visit of many a coastal vil-

lages of Thatta and Badin district it could be concluded that average migration ratio is ranging from 25 to 35 percent.

7.6 BIODIVERSITY LOSS

Biodiversity Loss in coastal talukas of Badin is severe. As reported by local population, especially elders, 220 species of crops, herbs, shrubs, grasses, trees, birds, mammals, reptiles and insects has been vanished in district Badin alone that include the major species like Motya, Ganja, Sugdasi [high quality rice], Nar Bajra, Jawar, Makai, Mung, Masoor, Matri, Daneenh, Dangni, Dabhar, Bart, Mandhano, Makhni, Mundheri, Mundhero, Mot, Moth, Mangryal, Gangni, Pawari, Span, Deer, Sorathi, top, bakeeh, Lepar, Bukan, Bhegro, Dhamoori, Lichan, Kalooro, Kirir, Kanh, Kandero, Gedoori, Dhalyar, Asri Lau, Jar Kheri, Jasadoi, Gidamri, Burir, Hanj Mero, Hanj Neergi, Dhaunri Meri, Dhaunri Ganeri, Cheeklo Mero, Khobai Cheeklo, Geno, Malanng, Cobra, Gado, Lundo Mero, Lundi, Khapur, [Snakes], Damar, Karo Wichhon, Jau, Jhari Tindini, Garhi Golari, Jau, Kengho, Kari Tidi, Achhi Tidi, Denbhoo Karo, Nor, Jhang Bilo, Pasalo Bilo, Thar Jaho, Goh, Fox, Pig, Sando, Wolf, Charakh, Rabbit, Sirh, Black Mouse, Kuo Meto, Dear and Gazelle etc.

7.6.1 Pollution

The introduction of industry and massive population near Sindh coast has adding negatively to the Indus Delta ecology. Unfortunately, pollutants are dumped into

the sea that badly pollutes the vast water mass of the coastal zone. Indus Delta is prone to following kinds of pollution:

7.6.2 Urban Waste

Karachi the only Port City of Pakistan, is victim of unplanned development, with execrated demographic accumulation ratio. 70 percent industry of the country runs here. The city with 12 million population, today, nearly doubles after a decade since last 55 years. Karachi uses approximately 500 million gallons per day [mgd] of water, discharges at least 250 mgd of sewage and generates 3,000-5,000 tonnes of solid waste. Approximately 70 per cent of untreated wastewater enters the sea, mostly through sewers, dried bad of Malir and Lyari rivers and sevral creeks. The city has the capacity to properly dispose off only 20-33% of its solid waste. The estimation of registered industrial units in S.I.T.E West Karachi is approximately 1,600, whereas the total number of registered and unregistered units is about 2,200.The other industrial estates exist in the Port Qasim, Federal 'B' Area, North Karachi, and Korangi. Established in S.I.T.E. West Karachi is in close proximity to the Karachi Port. It is immediately adjacent to the mouth of the Lyari River, where it empties into the Manora Channel of the Arabian Sea. The S.I.T.E. covering 4,500 acres area is a hub of textiles, heavy mechanical, beverages, automobiles, silk, oil, soap, foodstuffs, chemicals, pharmaceuticals, steel, glass, cigarettes, paints, filament yarn and ready-made garments industria units. The majority of the industrial units are large

water consumes more than 1922500 litters a day that is disposed of to the sea without being treated. According to a PCSIR [1999] study, huge amounts of toxic metals have been found in the marine life, such as fish, lobster, crabs and shrimp. The metals include mercury, cadmium, chromium, lead, arsenic, and zinc. Many of these metals are carcinogens and can cause genetic deformities and other fatal diseases. They are mainly released by the industrial estates. Hardly 2% of these industries have the facilities to treat their effluents before releasing. The results of all of these pollutants are that micro-organisms [planktons] consume them and they enter the food chain. An IUCN study of fishmeal [made of locally caught fish] used as feed for poultry discovered that it had 33 ppm of chromium. High levels of chromium were found in chicken and eggs as well [Dawn January 7, 1998]. Wastes from cement, paper and paint industries cause cancer. Wastes from mining and smelting industries damage kidneys. Wastes from industries, producing batteries and making lead-soldered pipe joints, cause brain and nerve damage and, is highly dangerous for infants and pregnant women. Industrial solvents like benzene and trichloroethylene are strongly carcinogenic.

7.6.3 Ship Oil Spills

In Karachi Harbour, 90,000 tons [est.] oil products are unloaded from vessels and port terminals every year that ultimately spills oil. Besides oil spills, the port has no mechanism to handle oil leakage that occurs in daily port activities. The Karachi Port lacks modern reception facilities for oil and oily waters as well as sufficient means to

contain oil spills during unloading of tankcrs.

On August 15, 2003 *Tasman Spirit* a ship was carrying 67,000 tonnes of crude cargo oil for Pakistan Refinary near Karachi Port. A number of tanks were breached and oil began leaking. About 27000 tone oil was released into the sea, some 25,500 tonnes could be removed from the ship, and a further 14,500 tonnes remained on board until recovered in early September. An impact assessment report by IUCN says that the report estimated that, despite intensive efforts to transfer, disperse, contain and recover the oil, the area impacted by the spill covers at least 40 square kilometers. It is reported that extensive hydrocarbon contamination in seawater samples; counts of 1,000 dead fish at a single sampling station in a day; cell damage in phytoplankton communities; reduced numbers of polycheate worms, shellfish and starfish in the surface sands of Clifton [Karachi] Beach; and a possible loss of regeneration in mangroves. The report noted that 250 people sought treatment at a medical camp set up after the spill for respiratory ailments attributed to petroleum carbon exposure.

7.7 Impact on Fresh Water Bodies

The environmcntal degradation of Sindh's fresh water bodies includes basically the River Indus that is the lifeline of Pakistan and its southernmost province of Sindh. Due to drastic decrease in water discharges in the downstream of Kotri Barrage towards Indus Delta and the sea, the tail end of this greatest Himalayan river has almost been dried up completely affecting 2.7m population of Indus Delta; destroying 2.2m acres of fertile agricul-

tural lands; depleting seventh biggest mangrove forest of the world from past coverage of 660,000 ha to mere 73,001 ha.

The ravages of river water shortage has also affected the northern and central part of Sindh in the upstream, where cash crops of cotton, wheat and rice have been destroyed one after another during prolonged dry spell and scarcity of irrigational supplies for the past two decades.

The other major sweet water bodies of Sindh spoiled under water famine include Manchhar Lake, Hamal Lake, Drigh Bala besides Makhhi Lake and other Chotiari Reservoir lakes.

Keenjhar and Hajeji, the major lakes of Thatta are declared Ramsir Sites. Besides, there are nearly hundred minor lakes only in Thatta district. These lakes are usually filled by river water flowing in the downstream of Kotri Barrage (the last barrage on Indus). Due to water shortage in Indus, these fresh water lakes are severely under degradation. Keenjhar, the third biggest lake of Sindh after Manchhar and Hamal Lake, alone receives water even in the water shortage period, because this is the main source of drinking water requirement of Karachi city. A number of other sweet-water lakes have converted into saline. Their degradation has deprived a large number of people of their traditional livelihoods.

The lakes of Thatta and Badin that are degraded and under the threat include Jubho, Nurriri, Dahee, Shaikh Karhio, Phoosna, Chareno, Khanjo, Jari, Jaffarali, Nira Dhand, Dhabka lake, Soomaar lake, Soomro Lake, Haleji, Hadero, Keenjhar, Jafri, Mahboob Shah, Karo, Karojo, Chatch, Ghungri, etc.

8. CONCLUSIONS, PROPOSALS, RECOMMENDATIONS

Even after lapse of six long years, the people of Indus Delta have not as yet come out of the shock of the Cyclone 02A that hit them on May 19, 20, 1999. Besides bringing about an imminent devastation, the 1999 disaster left behind the most horrible impact of lasting nature on the livelihood of the poor fishing communities in the coastal areas of Sindh. The tsunami-like tidal waves of the sea hitting the Sindh coast filled all depressions in the delta used as lakes by the fisher-folk with gravel sand. Thus the water of rising tides of the sea never stayed in the area, nor the sweet and fresh river water ever visited this area located in the downstream of Kotri Barrage. This resulted in vanishing prospects of fishing for inhabitants of delta both in Thatta and Badin districts. While the highly affected area was Jaati, the condition of five other sub-divisions of Thatta district and two sub-divisions of Badin district was also not rehabilitated even partially.

Many fishermen and women confessed in individual and group interviews that after havoc of 1999, they had first seen the river water in their area (Badn) only in 2005 during which sweet water flowed in the dried bed of Mir Wah in its tail-end after six long years.

The agony of the Badin fishers was further intensified by the failed project of LBOD, which has been damaged time and again since its inception, and the authorities have never attempted to repair it for good. As a result, the seawater containing fish is drained out back through broken banks of LBOD. The Cyclone 1999 destroyed deltaic

lakes and the un-repaired breaches of LBOD drained out all water from the area back to the sea; so, no water, no fish, and no livelihood.

As a result of the study pertaining to the vulnerability of the coastal communities of Sindh in Indus Delta in case of natural and man-made disasters such as cyclones, earthquakes, rain-floods and droughts, it has been made out keeping in view the indigenous survival mechanisms as well as international standards of disaster mitigation and coping mechanisms that the following urgent remedial measures must be taken to reduce disaster vulnerability of the deltaic population of Sindh:

1. The houses must be built on elevated places such as mounds and sand dunes so as to protect the populace from inundation during floods. The Badin area is particularly vulnerable to the ravaging floods by ill-designed LBOD (Left Bank Outfall Drain), which had been declared as 'major cause of concern' in official record of the respective District Government (Badin) of Sindh. The district of Thatta, and all other areas of Delta are low-lying - a few inches above sea level - thus vulnerable to floods as well as tidal waves of the sea.
2. The houses must have low roofs. Structures with steep walls and spacious premises are more vulnerable to destruction during cyclonic onslaught, the tempests in particular. A mosque built with baked bricks in area of Shaikh Qarhiyo's shrine in Badin taluka disappeared almost completely during Cyclone 02A in May 1999 because it was a spacious structure.
3. The houses with modern architectural strength and sus-

tainability against disasters are always the dire need of the fishing communities in Indus Delta; however, such a Government scheme initiated during premiership of Nawaz Sharif in mid nineties pertaining to the construction of 180 Pucca (cemented) houses in Golo Mandhro village of Union Council Bhugra Memon in Badin taluka has not as yet (2005) been implemented. The Shelter Houses constructed by Pakistan Fisherfolk Forum (PFF) though in small numbers have provided relief to the people whom they have been handed over completely.

4. The elevated platforms duly reinforced with iron and cement, and fixed with strong pillars can serve as enclave for fishers in case of earthquake, tsunami, cyclone and tempest etc. Such an experiment by the Japanese has attained remarkable success. It is more so important in case of Indus Delta, where according to the indigenous population, the people made human-chains through entanglement of their arms and legs just to bear the onslaught of cyclonic winds and protect them and their family members from being flown away by the calamity. After the roofs of their houses were flown away, they caught hold of the wooden pillars of their houses fixed in the soil just to protect them from storm.
5. According to oceanographic investigations, the cyclonic onslaughts, tempests and tsunami-like disasters hit the coastal areas within about three kilometers area. Although it is impracticable to have human inhibition three kilometers away from the sea, the only way out in such case is to take special preventive measures for

protection of fishing villages and their fishing communities within three kilometers of the sea. For it, the low -roof houses on elevated platforms having strong RCC (Reinforced with Concrete and Cement) pillars and iron chains would serve as a prerequisite for saving lives of the fishers and their families including children, women and old men.

6. The long-standing demand about early warning system pertaining to commencing calamity as pre-disaster measure could avert the danger on great extent. However, no any breakthrough has been made in this context so far. The fishing boats need relevant equipment for receiving early warning system to escape any tempest, cyclonic onslaught or development of any tsunami in the sea.
7. The study revealed that there is strong element of public participation among the coastal fishing communities in Indus Delta during any emergency. However, all classes and groups of people do not respond equally in all cases during the hour of need.
8. Although an earthen embankment cannot be erected in front of the sea to check its encroachment on the coast, yet some knowledgeable people of Indus Delta suggested during the study that agricultural areas, fishing villages, heritage sites (archaeological ruins) and other areas can be guarded from oceanic tides by earthen embankments as a measure of temporary relief from seawater flooding.
9. The Indus Delta must be declared as calamity-hit area in case there is no flow of sweet and fresh river water in the downstream of Kotri Barrage to the tune of 35

MAF per annum. For it, the government must study the creation of a Water Act for the Indus Delta Echo-Region to improve the legal frame that rules this resource, and manage this southern region of Sindh for welfare and sustainability of livelihood of the fishing communities.

10. In the same line, the fisheries laws should be implemented. The free access to the coastline should be assured by the laws, so as to permit the local and indigenous communities the access to the resources on which they solely depend. The coastline must be a public area and the harbors must be improved with facilities for waste disposal to manage them in a proper manner.
11. Water release of at least 35 MAF in the downstream of Kotri Barrage is a must for rehabilitation of the Indus Delta Eco-Region, and for the maintenance of ecology and economy of the Indus Delta. By preventing the water loss of the Indus River System amounting to about 40%, the required supply of river water to the Delta is possible.
12. The deltaic area covered by mangroves should be increased by re-plantation plans. Attempts must be made to purify the coastal waters. While these measures would also create employment in an area, it will greatly help maintain the ecological equilibrium of delta; and with it the Botanic Barrier (BB) would be created for resisting tsunami-like disasters.
13. The government should assure that all fishing villages will have at least one Clean Water Point that can be a well under quality control, or be based on the transportation of pure water that should be for free to common people for drinking and cooking purposes.

14. The government should immediately prohibit the use of pesticides that are currently forbidden in other countries given their adverse effects on environment, working people and their health including cancer and other incurable diseases. The declared hazardous pesticides such as organochlorine, organophosphorus and carbonate must be prohibited strictly. The government should immediately control the discharges from the industry to avoid the release of poisoning effluents especially of the sugar mills particularly in Badin area.
15. An education campaign should be developed by the government to assure that the population knows how to protect them from disasters such as Earthquakes, Cyclones, Tsunamis, Tempests, Floods and disease that follows.
16. Trawlers, factory-ships and long-liners should be brought under control, and their hazardous fish-nets and destructive fishing activity be prohibited in certain areas and periods of the year to permit the reproduction of the species.

A Master Plan should be developed for the rehabilitation, conservation and socio-economic development of the Indus Delta Echo-Region involving initiatives of non-government and government agencies keeping in mind the adequate river water discharges in the downstream of Kotri Barrage to the Indus Delta and the sea as a prerequisite.

REFERENCES

1. Daily THE STAR, Karachi, a publication of the DAWN Group of Newspapers, August 10, 2002, News

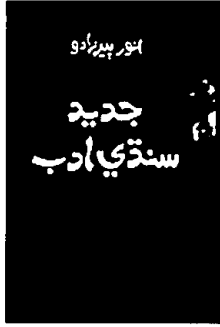
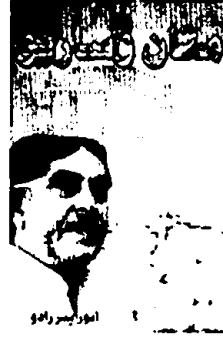
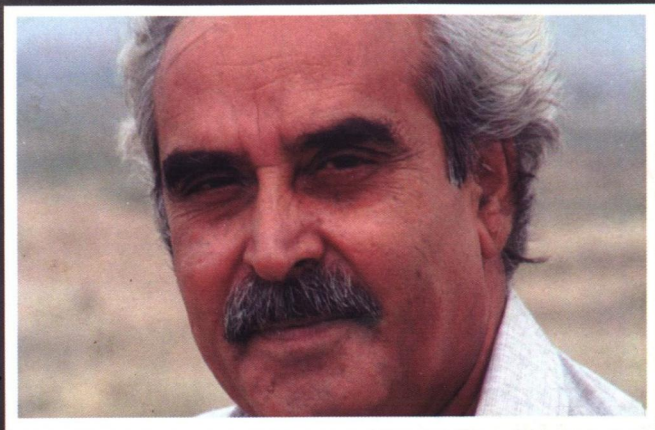
Report by Anwer Pirzado.
2. SPRIDER Study-1 by Zulfiqar Shah on Environmental Assessment of Indus Delta.
3. Oxford English to English Dictionary meaning along with its interpretation.
4. DAWN, Karachi, News Story, March 24, 2006.
5. National Drainage Program – a curse for coastal communities, by ACTIONAID Pakistan September 2004.
6. Environmental Assessment of Indus Delta by Zulfiqar Shah 1994.
7. SPRIDER Study-2 by Idris Rajput 'Impact of water shortages on Indus Delta'.
8. http://www.ntnu.no/-Rohit%20Dr.ing%20final1.pdf
9. DAWN, Karachi Nov 26, 2005
10. SPRIDER Study-1 &2

Bibliography of books

- Memoirs on Sindh by R. HUGHES THOMAS, First Published 1855, Reprint 1993, Delhi.
- Indus Delta In Retrospect by Commander (Retd.) Syed Mazahar Husain, Pakistan Navy, First published March 1990.
- THE LURE OF THE INDUS by Lieut.-General Sir George MacMUNN.
- THE INDUS AND ITS PROVINCES, and their Political and Commercial Importance by W. P. ANDREWS, First published 1857, Reprint 1986, Karachi.
- INDUS VALLEY CIVILIZATION by Ashim Kumar Roy & N.N. Gidwani, 1982 Meerut, INDIA.

- The Birth of Indian Civilization by RAYMOND & BRIDGET ALLCHIN, First published 1968, Penguin Books, Baltimore, Maryland 21207, USA.
- The Economic Geography of Sindh by Manik Pithawalla 1959, Karachi.
- THE INDUS DELTA COUNTRY by Alexandar Haig 1887.
- THE INDUS CIVILIZATION by Sir Mortimer Wheeler, Cam-ridge, First Published 1953.
- Abu F., Meynell, P.J., Sea level rise - Possible impacts on the Indus Delta, Korangi Ecosystem Project, Paper No.2, 1992
- Asianics Agro-Dev. International {Pvt] Ltd, Tarbela Dam and related aspects of the Indus River Basin, Pakistan, A WCD case study preparedas an input to the World Commission on Dams, Cape Town, 2000
- Brohi, Sikandar, Indus Delta Degradation & its impacts on Local Conununities, Action aid â€“ PFF, 2004
- Clift, P. D., et al, 55 million years of Tibetan and Karakoram evolution recorded in the Indus Fan: EOS, 2001
- Federal Bureau of Statistics, Pakistan Statistical Yearbook 2001, April 2001.
- Global Water Partnership, Draft South Asia - Water Vision 2025: Country Report - Pakistan, 2000
- Haq, Bilal U., Past, Present and Future of the Indus Delta, 1999
- Hassan, Arif, "Death of Indus Delta," In Down to Earth, Nairobi, Kenya: RIOD, June 30, 1992
- Irrigation and Power Department, GOS, Study on Minimum Flow Required Downstream of
- IUCN, Environmental Degradation and Impacts on Livelihoods: Sea Intrusion - A Case Study
- IUCN, Environmental Economic Evaluation: Mangrove Ecosys-tem of the Indus Delta
- IUCN, Possible effects of the Indus water accord on the Indus Delta Ecosystem.

- IUCN, Tusman Sprit Oil Spill Assessment Report, September 2003 January 1995.
- Mehran University of Engineering and Technology, Ghora Bari Outfall Drainage System, 2003
- Fishermen Community at Indus, Sindh, Thesis Report for Department of Architecture and Planning Dawood College of Engineering and Technology Karachi, April 1987
- NIO, Bed Level Survey of LBOD Tidal Link, KPOD, DPOD and Shah Samando Creek at outfall of Tidal Link by Echo Sounding, 2002
- Oxford University Press, Proceedings of a Symposium at Burlington House, London, 'The Indus River - Biodiversity, Resources, Humankind', July 1994
- Panhwar, M.H., Seepage of water of the River Indus and occurrence of fresh ground water in Sindh, 1999
- Population and Census Organization, Census Reports of Badin, Thatta, Hyderabad, Mirpurkhas, Sanghar and Nawabshah Districts, January 2000
- Qureshi, M. T., 1986. Working plan of mangrove [Coastal Forest form
- Qureshi, M. T., Experimental Plantation for Rehabilitation of Mangrove, 1990
- Sindh University, Water Shortage in Sindh, 2004
- WAPDA, "Annual Report 1999-2000", 2001.
- Warsi, M., Indus and Other River Basin of Pakistan, Stream Flow
- Records, Case Study Report. WAPDA, 1991
- WWF, Forever Indus, 2004 Pollution of Coastal Area Waters Deplored, Dawn, June 6, 1992, Karachi
- Pollution of Costal Area Waters Deplored, Dawn June 4, 1992, Karachi
- Sea Intrusion, Dawn, February 22, 2004, Karachi

ANWER PIRZADO ACADEMY PUBLICATIONS

Contact # 0334-3007566

Mere words cannot portray in full the beauty of the legendary River Indus nor still photographs or for that matter the eye of the video camera. The thing of beauty which is Indus, having innumerable faces, is therefore only worth seeing.

The remedy to all ailments of Indus Delta is WATER and WATER only. An abundant flow of sweet and fresh river water in the down-stream of Kotri Barrage to the tail end of the river and the sea is the prerequisite and basic requirement for complete rehabilitation of Indus Delta eco-region of Sindh.

Anwer Pirzado

Title by Ameeq Pirzado

پڙهندڙ نسُل . پَ نَ

The Reading Generation

1960 جي ڏهاڪي ۾ عبدالله حسين ” اُداس نسلين“ نالي ڪتاب لکيو. 70 واري ڏهاڪي ۾ وري ماڻڪَ ”لُڙهندَڙ نَسُل“ نالي ڪتاب لکي پنهنجي دورَ جي عڪاسي ڪرڻ جي ڪوشش ڪئي. امداد حُسينيءَ وري 70 واري ڏهاڪي ۾ ئي لکيو:

انڌي ماءُ ڄڻيندي آهي اونڌا سونڌا ٻارَ
ايندڙ نسل سَمورو هوندو گونگا ٻوڙا ٻارَ

هر دور جي نوجوانن کي اُداس، لُڙهندَڙ، ڪَڙهندڙ، ڪُڙهندڙ، ٻَرندڙ، ڦُرندڙ، ڪِرَندڙ، اوسيئڙو ڪَندَڙُ، ياڙي، ڪاڙُو، پاڇوڪَڙُ، ڪاوڙيل ۽ وِڙهندڙ نسلن سان منسوب ڪري سَگهجي ٿو، پَر اسان اِنهن سڀني وِچان ”پڙهندڙ“ نسل جا ڳولائو آهيون. ڪتابن کي ڪاڳر تان کڻي ڪمپيوٽر جي دنيا ۾ آڻڻ، ٻين لفظن ۾ برقي ڪتاب يعني e-books ناهي ورهائڻ جي وسيلي پڙهندڙ نسل کي وَڌڻ، ويجهَڻ ۽ هِڪَ ٻِئي کي ڳولي سَهڪاري تحريڪ جي رستي تي آڻِڻَ جي آسَ رکون ٿا.

پڙهندڙ نَسل (پَـنَ) ڪا بہ تنظيمَ ناهي. اُنَ جو ڪـو بـہ صدر، عُهديدار يا پايو وِجهندڙ نہ آهي. جيڪڏهن ڪو بہ شخص اهـڙي دعوىٰ ڪري ٿـو تـہ پَڪَ ڄاڻو تـہ اُهو ڪُـوڙو آهـي. نـہ ئي وري پَـنَ جي نالي ڪي پئسا گڏ ڪيا ويندا. جيڪـڏهن ڪـو اهڙي ڪوشش ڪري ٿو تہ پَڪَ ڄاڻو تہ اُهو بہِ ڪُوڙو آهي.

جَهڙيءَ طَرَح وڻـن جا پَـنَ ساوا، ڳاڙها، نيرا، پيلا يا ناسي هوندا آهن اَهڙيءَ طرح پَڙهندڙ نَسُل وارا پَـنَ بہ مختَلِف آهـن ۽ هوندا. اُهي ساڳِئي ئي وقت اُداس ۽ پڙهندڙ، بَرندڙ ۽ پڙهندڙ، سُست ۽ پڙهندڙ يا وِڙهندڙ ۽ پڙهندڙ بـہ ٿـي سـگهن ٿـا. ٻيـن لفظن ۾ پَـنَ ڪا خُصوصي ۽ تالي لڳل ڪِلَب Exclusive Club نـہ آهي.

ڪوشش اها هوندي تـہ پَـنَ جا سڀ ڪَم ڪـار سَهڪاري ۽ رَضاڪار بنيادن تي ٿين، پر ممڪن آهي تـہ ڪي ڪم اُجرتـي بنيـادن تـي بـہ ٿِيـن. اهـڙي حالت ۾ پَـنَ پاڻ هِڪَٻِئي جي مدد ڪَـرڻ جـي اُصـولَ هيـٺ ڏي وَٺُ ڪنـدا ۽ غيرتجـارتي non-commercial رهنـدا. پَنَـن پـاران ڪتـابن کـي ڊِجيِتـائِيز digitize ڪرڻ جي عَمَلَ مان ڪـو بـہ مالي فائدو يا نفعو حاصل ڪـرڻ جي ڪوشش نہ ڪئي ويندي.

ڪتابن کي ڊِجيِٽائِيز ڪرڻ کان پـو ٻيو اهم مرحلو وِرهائڻ distribution جو ٿيندو. اِهو ڪم ڪرڻ وارن مـان جيڪـڏهن ڪـو پيسا ڪمائي سگهي ٿو تہ ڀلي ڪمـائي، رُڳو پَنَـن سان اُن جو ڪو بہ لاڳاپو نہ هوندو.

پَنَن کي کُليل اکرن ۾ صلاح ڏجي ٿي تہ هو وَسَ پٺاندڙ وڌِ کان وَڌِ ڪتاب خريد ڪَري ڪتابن جي ليکڪَن، ڇپائيندڙن ۽ ڇاپيندڙن کي هِمٿائِن. پر ساڳِئي وقت عِلم حاصل ڪرڻ ۽ ڄاڻ کي ڦهلائڻ جي ڪوشش دوران کَنهن بہ رُڪاوٽَ کي نہ مڃن.

شيخ اَيازَ علمَ، ڄاڻ، سمجهہَ ۽ ڏاهپَ کي گيتَ، بيتَ، سِٽَ، پُڪارَ سان تَشبيهہ ڏيندي انهن سيني کي بَمن، گولين ۽ بارودَ جي مدِ مقابل بيهاريو آهي. اياز چوي ٿو تہ:

گيتَ بہِ ڄڻ گوريلا آهن، جي ويريءَ تي وار ڪَرن ٿا.

... ...

جئن جئن جاڙ وڌي ٿي جَڳَ ۾، هو ٻوليءَ جي آڙ ڇُپن ٿا؛
ريتيءَ تي راتاها ڪن ٿا، موٽي مَنجهہِ پهاڙ ڇُپن ٿا؛

... ...

ڪالهہَ هُيا جي سُرخ گُلن جيئن، اڄ ڪلهہ نيلا پيلا آهن؛
گيتَ بہِ ڄڻ گوريلا آهن........

... ...

هي بيتُ اَٿي، هي بَم- گولو،
جيڪي بہ ڪٺين، جيڪي بہ ڪٺين!

مون لاءِ ٻنهي ۾ فَرَقُ نہ آ، هي بيتُ بہ بَمَ جو ساٿي آ،
جنهن رِڻَ ۾ رات ڪَيا راڙا، تنهن هَڏَ ۽ چَمَ جو ساٿي آ ـ

اِن حسابَ سان اڄ ڪالهہ ڪي ڪي پاڻَ تي اِهو سوچي مَڙهڻ تہ ”هاڻي ويڙهہ ۽ عمل جو دور آهي، اُن ڪري پڙهڻ تي وقت نہ وڃايو“ ناداني جي نشاني آهي.

پَڑهن جو پڙهڻ عام ڪِتابي ڪيڙن وانگر رُڳو نِصابي ڪتابن تائين محدود نہ هوندو. رڳو نصابي ڪتابن ۾ پاڻ کي قيد ڪري ڇڏڻ سان سماج ۾ سماجي حالتن تان نظر ڪڄي ويندي ۽ نتيجي طور سماجي ۽ حڪومتي پاليسيون policies اڻڄاڻن ۽ نادانن جي هٿن ۾ رهنديون. پَڙهَ نِصابي ڪتابن سان گڏوگڏ ادبي، تاريخي، سياسي، سماجي، اقتصادي، سائنسي ۽ ٻين ڪتابن کي پڙهي سماجي حالتن کي بهتر بنائڻ جي ڪوشش ڪندا.

پَڙهندڙ نَسُل جا پَڙهَ سيني کي **چو، ڇالاءِ ۽ ڪيئن** جهڙن سوالن کي هر بَيانَ تي لاڳو ڪرڻ جي ڪوٺَ ڏين ٿا ۽ انهن تي ويچار ڪرڻ سان گڏ جوابَ ڳولڻ کي نہ رڳو پنهنجو حق، پر فرض ۽ اٽل گهرج unavoidable necessity سمجهندي ڪتابن کي پاڻ پڙهڻ ۽ وڌ کان وڌ ماڻهن تائين پهچائڻ جي ڪوشش جديد ترين طريقن وسيلي ڪرڻ جو ويچار رکن ٿا.

توهان بہ پڙهڻ، پڙهائڻ ۽ ڦهلائڻ جي اِن سهڪاري تحريڪ ۾ شامل ٿي سگهو ٿا. بَس پنهنجي اوسي پاسي ۾ ڏِسو، هر قسم جا ڳاڙها ٿوڙي نيرا، ساوا توڙي پيلا پن ضرور نظر اچي ويندا.

وڻ وڻ کي مون ڀاڪي پائي چيو تہ ”منهنجا ڀاءُ
پهتو منهنجي من ۾ تنهنجي پَنَ پَنَ جو پڙلاءُ“.
- اياز (ڪلهي پاتم ڪينرو)